THE JOURNAL OF PERIODONTOLOGY

July
1943

Published by
THE AMERICAN ACADEMY OF PERIODONTOLOGY
VOLUME 14
NUMBER 2

CONTENTS

Rationalization of Periodontal Pocket Therapy . . . . . CHARLES H. M. WILLIAMS 67

The Tooth Brush . . . . . BENJAMIN ALSTADT . . 77

Two Cases of Subgingival Proliferative Lesions of Probable Hormonal Origin . . . . . DANIEL E. ZISKIN and HERBERT F. SILVERS . . 89

Editorials 95

Abstracts and Extracts of Current Dental Literature 97

A Bird's-Eye View of Current Periodontal Literature 1927-1943 . 102

Index of Abstracts and Authors 103

Publication in the JOURNAL OF PERIODONTOLOGY *is not to be understood as endorsement by the Journal or the* AMERICAN ACADEMY OF PERIODONTOLOGY *of opinions expressed in any article, abstract or extract. The object of publishing the various views is to present them without prejudice to the reader for his own evaluation.*

THE JOURNAL OF PERIODONTOLOGY is published to serve as the professional journal of periodontia; to keep dentists in touch with research being carried on in this field and related sciences; to stimulate greater interest in the supporting tissues of the teeth and their relation to oral and general health. The plan to continue the publication of abstracts indefinitely will make the Journal a fund of extensive information, readily available to students, teachers, researchers, and clinicians.

The Journal is the official organ of the American Academy of Periodontology and will contain, therefore, those papers of scientific and clinical interest which are presented at the annual meetings of that society. Abstracts of important articles on periodontia that appeared during the year of 1942 are continued in this and later numbers.

We are grateful to all who have made available the subject matter from which the abstracts and copies of abstracts have been made, including the authors of the original articles, owners of the journals mentioned in the text of the abstract section, and those who have aided in any way in compiling the material comprising this issue.

DENTAL LIBRARY

Directions for the Care of the Teeth

USE OF BRUSHES

"The brush should be selected, in form and consistency, to answer the desired object. Should we select for a child, we would regard the size as well as the firmness of the bristles; a brush between a hard and a soft will usually be best. Grown persons would select according to their judgment; the same rules are usually applicable to the adult as to the child. Should the gums be sensitive a soft brush would be better suited to the case. Whatever brush may be used, it should be done [used] effectually, not passing it directly crosswise, but moving it up and down on the teeth, so as to remove any formation between them, and to bring it in contact with those parts that the brush, in being moved across, may not reach. The grinding as well as the lingual surfaces should receive as much attention as the anterior surfaces. Floss silk, passed between the interstices will remove any foreign matter, and tend to keep them clean and polished, and may guard them from decay; the brush cannot reach this part of the tooth. Decay oftener comes here than in any other part.

"The teeth should be cleansed *four times every day:* in the morning before and after breakfast, after dinner, and, very certainly, the last thing before retiring at night. This is an important time, as the particles of food or any foreign matter, if not removed but remaining on the teeth during the hours of sleep, from the heat and moisture of the mouth become fomented and acrid, and act as a powerful chemical agent. By keeping the teeth literally clean, their liability to decay will be much diminished.

TOOTH PICKS

"These are very useful agents in assisting to keep the teeth free from foreign matter. . . .

"The excessive use of mineral waters also produces bad effects. Sweetmeats or candies, if much used, form an acrid or acidulated matter between the teeth, which is the primary cause of decay. The sweet we do not consider injurious to the teeth, it is the chemical change which takes place by fomentation, producing an acrid formation. Literal cleanliness at *all* times will obviate this difficulty."

Extracts from *Facts for the People.* By T. D. Thompson, D.D.S. Published in Boston, B. B. Mussey & Co., 1854. pp. 232-35.

THE JOURNAL OF PERIODONTOLOGY

JULY, NINETEEN HUNDRED FORTY-THREE

Rationalization of Periodontal Pocket Therapy*

By CHARLES H. M. WILLIAMS, D.D.S., B.SC. (DENT.)** *Toronto, Canada*

THE treatment of periodontal pockets will not be efficient until a rational basis of procedure has replaced the present somewhat haphazard system of choosing and applying the methods of treatment which are available. Most of the many techniques and materials which have been suggested for pocket therapy have some degree of value when properly applied but application of a single method of treatment to all pockets is ineffective in some conditions and unnecessarily tedious, or too radical in others. The high degree of efficiency which has been attained in the technique of preparing and filling carious cavities in teeth is undoubtedly largely the result of the rational system outlined by G. V. Black (1). This paper outlines a similar rational system for the treatment of periodontal pockets. In both practice and in teaching it has led to a pleasing degree of efficiency in this phase of periodontal therapy.

FACTORS WHICH INFLUENCE THE DEPTH OF PERIODONTAL POCKETS.

Increased depth of the gingival sulcus may result from either coronal movement of the gingival margin or apical extension of the base of the sulcus. Occasionally there is a coincidental or successive occurrence of both movements. The main result is that the distance between the gingival margin and the base of the sulcus is increased and a periodontal pocket is formed. Important factors which favor the establishment of deep periodontal pockets have been described by Box as:

1. Failure of gingival tissues to atrophy at the same rate as the apical movement of the base of the sulcus.
2. Swelling or hyperplasia of gingival tissue (2).

Conversely factors which favor the maintenance of shallow sulci are: atrophy of the gingival tissues and absence of swelling or hyperplasia of the gingival tissues.

The gingival tissues constitute a thin veneer over the alveolar edge. The pattern of the gingival tissues about the teeth and the extent of periodontal pockets is governed, in the main, by the contour of the bone margin which supports the soft tissues. Broad or "horizontal" resorption of the bone edge is usually associated with atrophy of the gingival tissues and shallow pockets (Fig. 1).

Sharply irregular or "vertical" resorption of the bone edge is usually associated

*Prepared for the *American Academy of Periodontology*. Published simultaneously in the *J.C.D.A.*
**Department of Periodontology, Faculty of Dentistry, University of Toronto.

DENTAL LIBRARY

with failure of the gingival tissues to atrophy and the resultant establishment of deep periodontal pockets (Fig. 2).

In the treatment of periodontal pockets it is of great importance to recognize that the position and extent of periodontal pockets is mainly controlled by the pattern of the alveolar edge which supports the gingival tissues.

CLASSIFICATION OF PERIODONTAL POCKETS

It is essential to classify pockets so that the various principles and methods which are employed in pocket therapy may be applied to the types of pockets for which they constitute efficient treatment. The term "periodontal pockets" is here employed to include all abnormal pockets between the gum tissue and the tooth and the two suggested divisions of these are referred to as "gingival pockets" and "true periodontal pockets."

GINGIVAL POCKETS

These pockets have sometimes been referred to as false or pseudo pockets. The increased depth of the sulcus is often largely the result of swelling or hyperplasia of the gingival mass. The base of the sulcus is coronal to the general level of the alveolar edge in the area and the tissues lateral to the inner wall of the pocket are composed entirely of soft tissue. The alveolar edge in the area is horizontal or broadly irregular (Fig. 3).

Gingival pockets may be subdivided as:

Edematous:

The increased bulk of the gingival tissue is mainly the result of edema associated with an obvious inflammation.

Hyperplastic:

The enlargement of the mass of the gingival tissue is the result of increased connective tissue content associated with a relatively non-inflammatory process.

TRUE PERIODONTAL POCKETS

The abnormal depth of these pockets is largely the result of apical movement of the base of the sulcus. The base of the sulcus is usually apical to the general level of the bone edge for the area and the tissues lateral to the inner wall of the sulcus usually contain some bone. The alveolar border is usually sharply irregular (Fig. 4).

Periodontal pockets are subdivided on the basis of lateral or horizontal extent as:

Narrow:

The general outline form of the pocket is a V shape.

Broad:

By lateral extension true periodontal pockets tend to assume a wide U-shaped form. In the advanced state in the lateral progression of these pockets the contiguous bone edge may become so broadly irregular that it is similar to the pattern associated with deep gingival pockets.

EXAMINATION AND CHARTING OF PERIODONTAL POCKETS

Accurate determination of the position and extent of periodontal pockets is essential if a rational system of treatment is to be applied successfully. It is also necessary that accurate records be made of the original extent of periodontal pockets so that the operator may be able to assess the value of the various methods of pocket therapy which are employed. Kronfeld and others have shown that the radiogram is not an accurate means of determining the location and size of periodontal pockets (3). Use of the finely calibrated periodontal probe shown in Fig. 5 and the system of charting shown in Fig. 6 have allowed a good degree of accuracy during the thirteen years of clinical observation that has led to many of the opinions expressed in this paper.

PRINCIPLES APPLICABLE TO PERIODONTAL POCKET THERAPY

Therapeutic principles designed to cause reduction of the depth of periodontal pockets may be based largely on efforts to convert factors which favor the establishment of deep pockets to those which favor the maintenance of shallow sulci. The therapeutic efforts are aimed at changing abnormal and unfavorable relations of the gingival margin, base of the pocket, and alveolar edge to more favorable, although not often original normal relations.

Methods of treatment which are intended to reduce the depth of periodontal pockets may employ one or both of two principles.

1. Causing the gingival margin to move apically toward the base of the pocket.

2. Causing the base of the pocket to move coronally toward the gingival margin. It is convenient to subdivide the first principle and to describe three principles for reducing

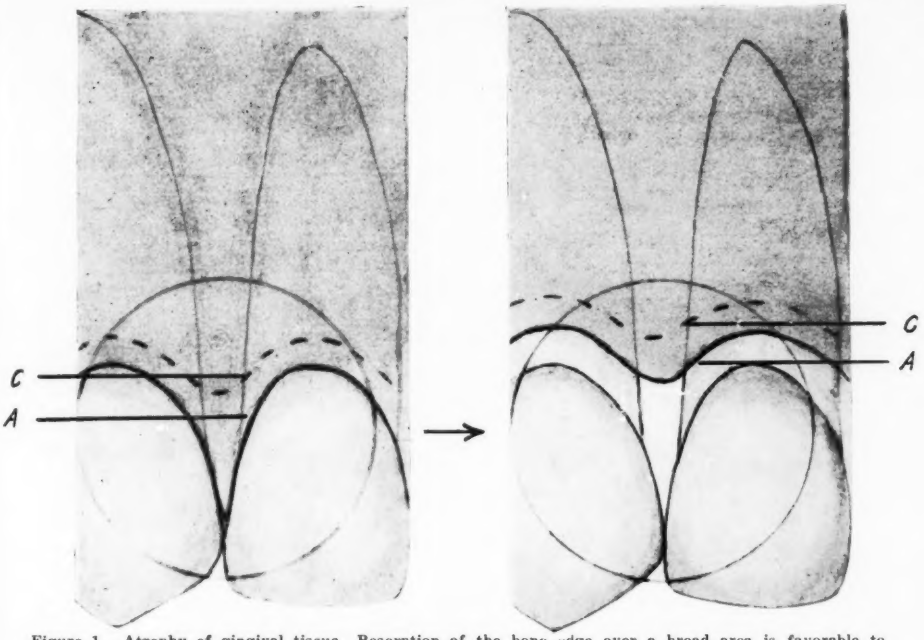


Figure 1. Atrophy of gingival tissue. Resorption of the bone edge over a broad area is favorable to recession of the gingival tissue and the maintenance of a shallow sulcus. A. Gingival margin. C. Edge of bone.

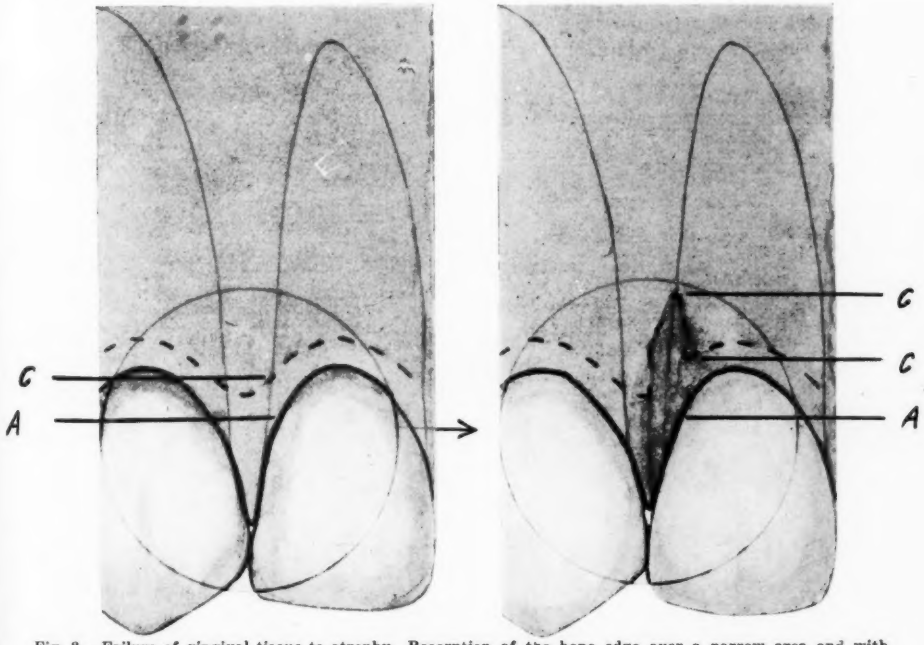


Fig. 2. Failure of gingival tissue to atrophy. Resorption of the bone edge over a narrow area and with sharply irregular pattern is unfavorable to atrophy of gingival tissue and favorable to the establishment of deep periodontal pockets. A. Gingival margin. C. Edge of bone.

the depth of gingival and periodontal pockets.

1. Reduction of swelling
2. Production of recession
3. Induction of reattachment

Reduction of swelling and production of recession both cause the gingival margin to be at a more apical position at the completion of treatment. The essential difference between the effect of the use of these principles is that in reduction of swelling the apical movement of the gingival margin is

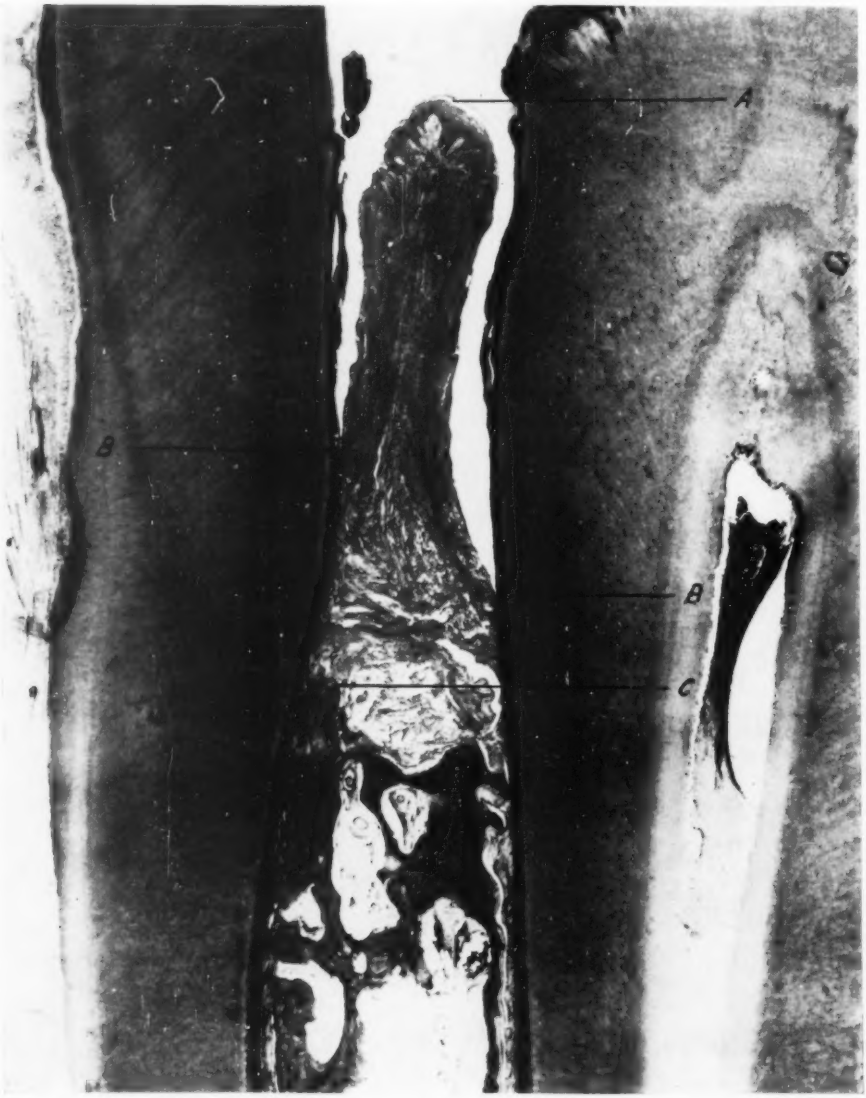


Fig. 3. Gingival Pockets. Inter-dental papilla showing gingival pockets. The base of the sulci is coronal to the bone edge in the area and the bone edge is essentially horizontal. A. Gingival margin. B. Bases of sulci. C. Edge of bone.

somewhat passive in character and in the production of recession the apical movement of the gingival margin is the result of active efforts deliberately aimed at that result. These two principles are applicable to different types of pockets and the methods of treatment employed under each principle are different.

A suggested application of the principles

Fig. 4. True Periodontal Pockets Inter-dental papilla showing shallow pocket at distal of bicuspid and deep pocket at mesial of molar. The base of the true periodontal pocket is below the bone edge in the area and the bone edge is markedly oblique or "vertical". A. Gingival margin. B. Bases of sulci. C. Bone edge.

of treatment to the types of pockets is shown below.

APPLICATION OF THE PRINCIPLES TO BE EMPLOYED IN TREATMENT TO THE CLASSIFICATION OF POCKETS

GINGIVAL POCKETS:	
Edematous →	Reduction of swelling
Hyperplastic →	Production of recession
PERIODONTAL POCKETS:	
Broad →	Production of recession
Narrow →	Production of recession or Induction of re-attachment

REDUCTION OF SWELLING

Indications:

The application of this principle is indicated in the treatment of gingival pockets of edematous type. Reduction of the bulk of the swollen gingival mass is accomplished by the employment of methods which cause or allow the re-establishment of normal blood and lymph circulation. It is fortunate from a treatment stand-point that the majority of all pockets are amenable to treatment by the application of this simple principle. (Fig. 7).

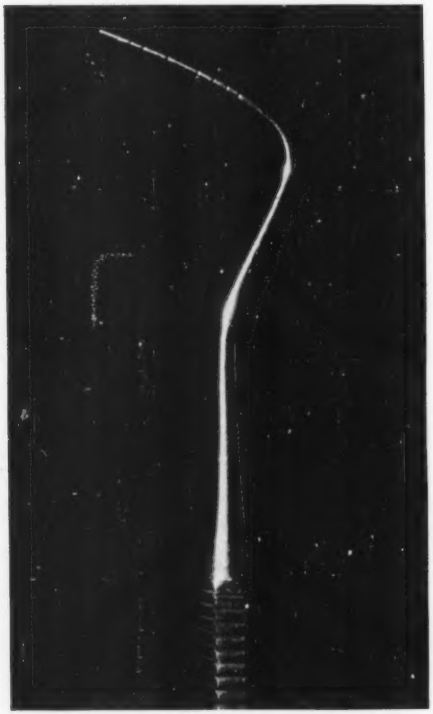


Fig. 5. Periodontal Probe. (Williams, Clev-dent). This probe is calibrated in millimetres. The fourth and sixth millimetre markings are left off to facilitate reading of shallow pockets (1-3mms.) and medium pockets (about 5mms.) and deep pockets (5mms. or more).

Technique:

Some of the common methods which are efficient in the reduction of swelling are listed below. They are classified on the basis of the means by which the results are attained.

Removing irritants: Scaling which includes the use of packs such as wax, cement or cotton to dilate the pockets and facilitate scaling, tooth-polishing, tooth-brushing, trimming fillings and partial dentures, correcting mouth-breathing, discontinuing the use of irritating drugs or foods.

Counteracting effects of irritants: Wax, cement, cotton or other packs.

Stimulating circulation: Oxygen insufflation, superoxol topically, massage, counter-irritant drugs, systemic treatment.

PRODUCTION OF RECESSION

Indications:

In the employment of this principle recession of the gingival margin is produced deliberately and, in most cases, with the intention that the recession shall be sustained. As a general and conservative rule this principle should only be applied in the treatment of those pockets where neither reduction of swelling or induction of re-attachment are feasible. Indications for employment of the principle induction of re-attachment are discussed later in this paper.

Gingival pockets of hyperplastic origin and all true periodontal pockets where induction of re-attachment is not feasible may be efficiently treated by the production of recession.

Gottlieb has said "research means to observe Nature's work carefully in order to understand how she does things. If we imitate Nature's way correctly we will have reliable guidance for our prophylactic and

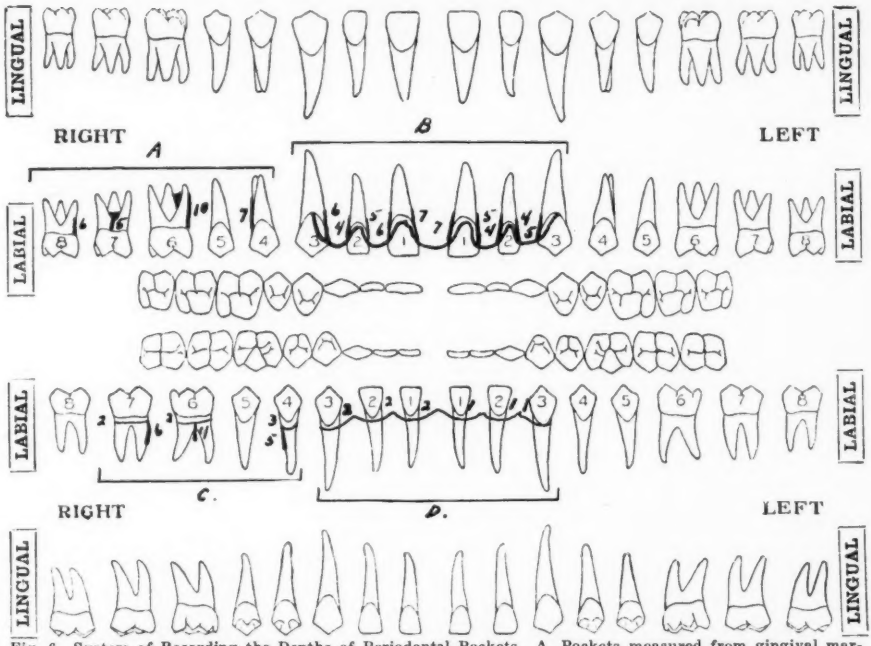


Fig. 6. System of Recording the Depths of Periodontal Pockets. A, Pockets measured from gingival margin at normal position. B, Pockets associated with swelling or hypertrophy. C, Pockets measured from the gingival margin after recession. D, Recession of gingival margin and no pockets.

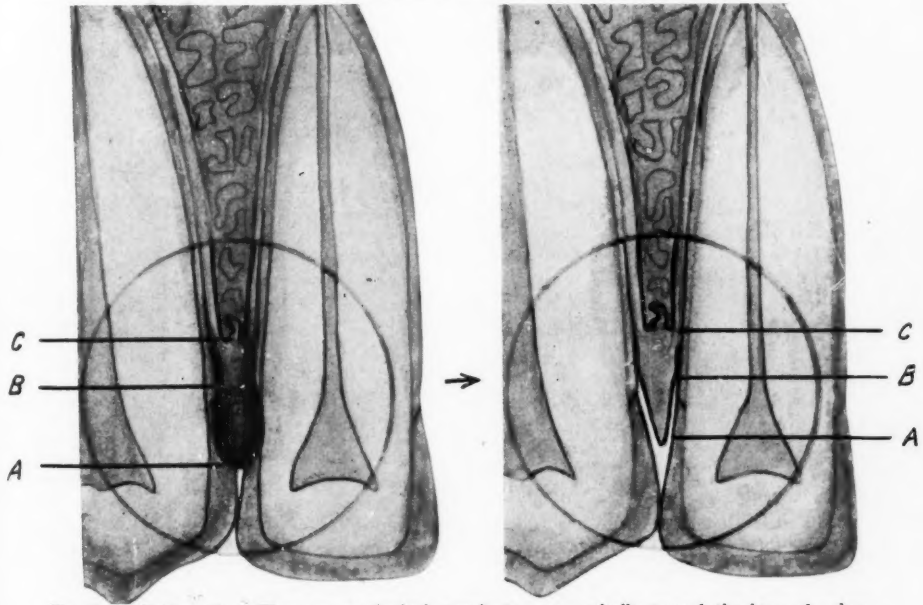


Fig. 7. Reduction of swelling causes gingival margin to move apically toward the base of sulcus. A. Gingival margin. B. Base of sulcus. C. Edge of bone.

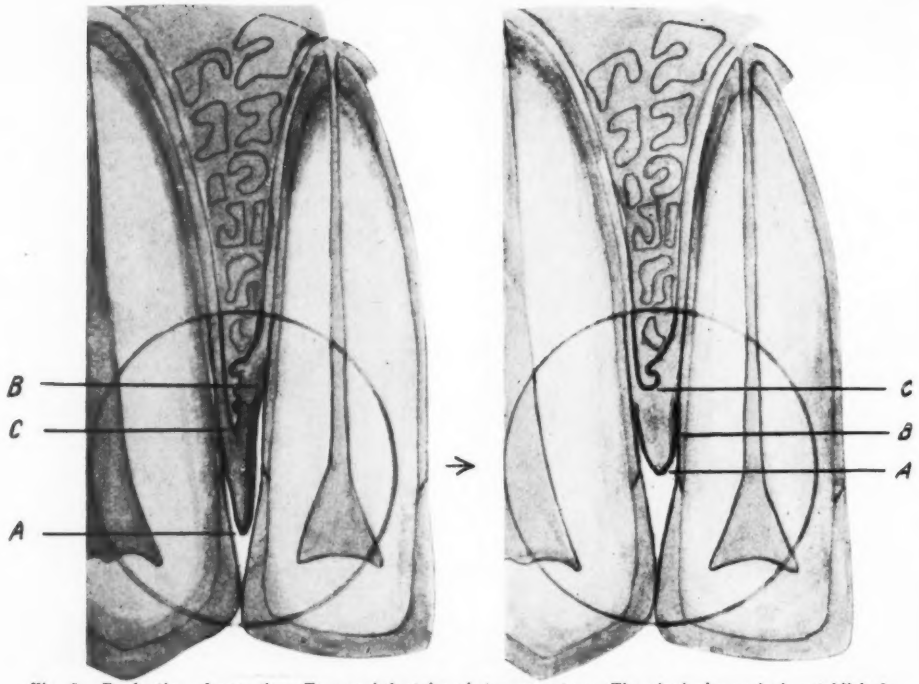


Fig. 8. Production of recession. True periodontal pocket narrow type. The gingival margin is established and maintained at a more apical position by means of removing the gingival wall of the pocket and changing the contour of the bone edge in the area shown. For true periodontal pockets of the broad type changing the bone contour is often not necessary. A. Gingival margin. B. Base of sulcus. C. Edge of bone.

therapeutic endeavours." (4). On the basis of clinical observation there are two main types of periodontal disease. Periodontitis simplex exhibits an even distribution of lesions, a relatively horizontal alveolar edge and relatively shallow pockets. In its later stages this condition tends to show marked resorption of the bone edge and recession of the gingival tissue but the pockets are still shallow. Periodontitis complex exhibits irregular distribution of lesions, "vertical" bone loss and deep pockets. As Box has pointed out, atrophy of the gingival tissue keeps pace with the apical movement of the bone edge when the bone edge remains horizontal or is broadly irregular and gingival tissue fails to atrophy when the bone edge is sharply irregular.

This observation of the natural control of crevice depths seems fundamental to the whole problem of production of recession in periodontal pockets. Intentional modification of the contour of the bone edge to render it more nearly horizontal is frequently the "extension for prevention of recurrence" phase of the technique for producing recession. In the writer's experience a large percentage of periodontal pockets of narrow type recur unless this phase of operative treatment is carefully performed. On the other hand periodontal pockets of the narrow type constitute a small percentage of all the pockets encountered in periodontal practice and the use of bone files and saws should be a very small but important part of the technical procedures in the treatment of periodontal pockets.

It was formerly assumed that the irregular bone masses contiguous to periodontal pockets were necrotic and should be removed to prevent reinfection of the area and consequent re-establishment of the pocket. The premise was faulty (the contiguous bone is rarely necrotic) but the clinical observation and the technique when judiciously applied are, in the opinion of the writer,

sound. Removal of normal or nearly normal bone in some operations for producing recession is of course no more pleasant, but it is just as necessary, as the removal of some normal tooth structure in the preparation of cavities in teeth.

Periodontal or true pockets are not always associated with sharp irregularities of the alveolar edge. In some pockets the change of bone contour has become broad and is often favorable to a recession which has not yet occurred. Pockets of this form are most frequently noticed where the original bone covering of the root surface was thin. Inflammation and infection in the area may have destroyed the thin alveolar tissue about a large part of the circumference of the tooth so that a broad pocket with a thin soft tissue wall results. These conditions are most frequently encountered about the labial surfaces of anterior teeth, between crowded lower incisors and at the lingual surfaces of upper molars. Under the above conditions the thin pocket walls often allow recession to occur naturally by atrophy but if recession has not yet occurred it is easy to produce. Such conditions may be satisfactorily treated by removing the soft tissue wall of the pocket and devoting little or no operating technique to changing the contour of the bone edge. (Fig. 8).

Technique:

Some of the common methods which have been found to be efficient in the production of recession are listed below. They are subdivided on the basis of the pattern of the pocket.

(a) Narrow true periodontal pocket where both soft tissue and bone contour require alteration.
Surgical excision.
Flap operation.

(b) Gingival pockets of hyperplastic type and broad periodontal pockets in which soft tissue contour only requires alteration.

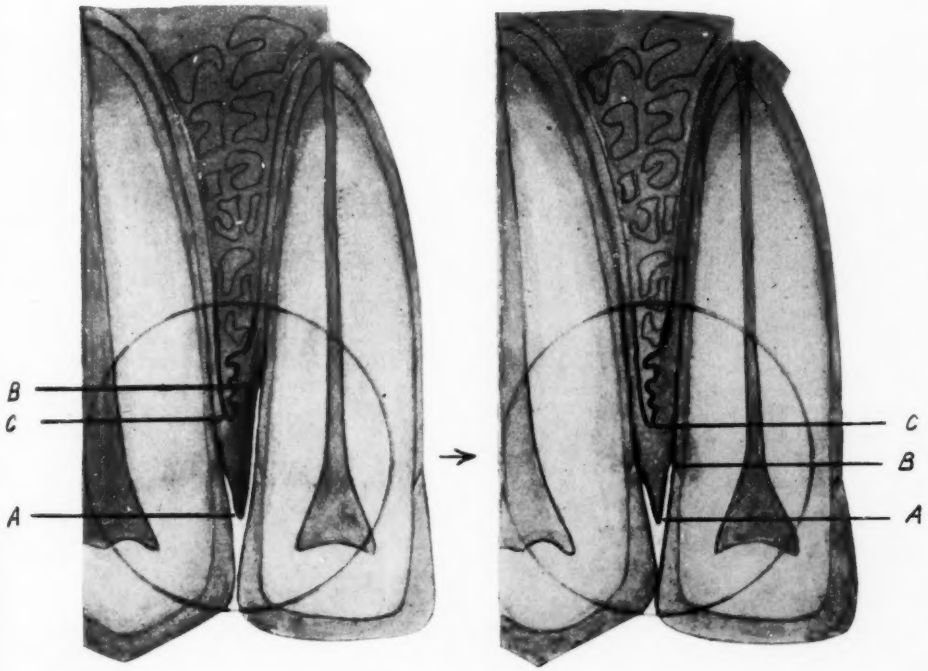


Fig. 9. Induction of reattachment. The base of the pocket is caused to be established near to the gingival margin by reattachment of the detached tissues. A. Gingival margin. B. Base of sulcus. C. Edge of bone.

Surgical excision.
Cauterization by drugs with or without packs, the actual cautery and the electro-coagulator. Pressure atrophy by use of wax, cement, cotton or other packs.

INDUCTION OF REATTACHMENT

Induction of reattachment is the ideal of periodontal therapy but like most ideals it is not regularly or easily attainable. The clinical records of many competent operators do indicate however, that a sustained reduction of periodontal pocket depth may be attained by closure of the pocket. This type of result is particularly pleasing when obtained about the anterior teeth where production of recession is often undesirable for aesthetic reasons. Whether organic reattachment of detached tissue can occur or whether the closure of the pocket occurs as the result of a tight readaptation of the soft tissues to the tooth is a discussion which is beyond the limits of this paper.

Indications:

Attempts to treat all pockets by induction of reattachment will result in a large percentage of failures. It is therefore necessary to select carefully the pockets to which this principle will be applied.

All systemic and local conditions which would influence healing should be favorable or liable to correction.

Narrow true periodontal pockets with thick walls composed largely of only slightly abnormal tissues are much more liable to react successfully than broad pockets with badly inflamed soft tissue walls.

Occlusal function should be liable to successful correction.

The oral hygiene should be good (Fig. 9).

Technique:

Common methods which have been successfully applied in the induction of reattachment are listed below. They are subdivided according to the pattern of pockets to which they are applicable.

(a) For straight and accessible pockets:
Intra-crevicular curettement
Cauterants to remove lining of pocket.
Repeated wax or other packs under mild pressure

(b) For inaccessible pockets:
Flap operation and curettement.

The excellent healing which is necessary to the induction of reattachment will only occur in a healthy or almost healthy field. The operative procedures to induce reattachment should always be preceded by treatment to improve the systemic and local factors which control healing.

SUMMARY

1. A rational system of applying the various methods of treatment to the different types of periodontal pockets allows a high degree of efficiency in this branch of dental practice.
2. Periodontal pockets have been classified as gingival pockets and true periodontal pockets.
3. Gingival pockets are subdivided as edematous and hyperplastic.
4. True periodontal pockets are subdivided as narrow and broad.
5. Principles which are applicable in reducing the depths of periodontal pockets are described as reduction of swelling, production of recession and induction of reattachment.
6. Common methods of treatment which are applicable in the employment of each of the aforementioned three principles are listed and the indications for their employment are described.

Medical Arts Bldg.

REFERENCES

1. Black, G. V., *A Work on Operative Dentistry*, p. 110. Chicago: Medico-Dental Publishing Co., 1920.
2. Box, H. K., *Treatment of the Periodontal Pocket*, p. 11. Toronto: University of Toronto Press, 1928.
3. Kronfeld, R., *Histopathology of the Teeth and Their Surrounding Structures*, p. 327. Philadelphia: Lea and Febiger, 1933.
4. Gottlieb, B., Post-graduate Lecture Course, American Academy of Periodontology, W. K. Kellogg Foundation Institute, Ann Arbor, Michigan, May, 1941.

The Tooth Brush

A FURTHER STUDY; RELATIVE TO CERVICAL ANATOMY

By BENJAMIN ALSTADT, D.D.S., New York, N. Y.

The science of dentistry has developed to a point where it is capable technically of the most minute exactnesses in its many varied restorative procedures. On the other hand, it has been slow to concern itself with the preventative bacteriological problems present in the oral cavity. Practically everything that nourishes the body goes into this cavity. A residue settles around the mouth tissues, rapidly decomposes, and the end-products of bacterial activity are rarely disturbed. Conditions within the oral cavity are particularly conducive to a rapid growth of bacteria and their by-products. The mouth harbors more bacteria and of more varied types, than any other part of the body.

Miller isolated 100 different kinds of bacteria from the fluids and deposits in the mouth. Brown and Head demonstrated the almost universal presence of the *B. influenzae*, streptococcus, staphylococcus, pneumococcus, *M. catarrhalis*, and *B. diptheriae*, in pus from pyorrhea pockets (1). Research laboratory findings of The American Dental Association show 1500 layers of living organisms common in many mouths. Continual seepage of these end-products from the diseased investing tissues of the teeth, enter the body via saliva and boluses of food traveling through the gastric system. The blood stream gets its share from broken down gingivae directly by absorption and from masticatory pressure pumping. The lung and bronchial tissues get their quota through aspiration. These decomposed products are absorbed slowly but continuously throughout our lives. There is no limit to the consequences that may follow, by lowering resistance to disease or even causing it directly.

Fuller and Fox have shown that

> . . . It is these end-products of bacteria lying in and around the crevicular area and their resultant inflammation that cause alveolar destruction, rather than the activity of bacteria directly on the bone cells, and the crevicular area is most vulnerable to this process (2).

Careful routine radiographic examination constantly reveals incipient alveolar bone crest absorption while the ensuing low tissue tone encourages pathosis in all its phases, from gingivitis to pyorrhea, from barely inflamed areas to foci of infection.

Merritt states that of all the diseases which affect the teeth, there are none more destructive in adult life than periodontoclasia (2).

Blanquie points out that

> . . . the tissue adjoining a periodontal lesion is analagous in type and formation to granulation tissue found on certain diseased root ends, that they are both chronic inflammatory tissues with the gingival tissues being continually replenished by its local flora, also that it approximates the ideal nidus for bacterial invasion. Bacteria in periodontal lesions may be. more virulent because of the ideal incubating environment (3).

Cogan suggests that gingival diseases may be septic foci of greater significance than pulpless teeth (4).

Meyer offers sufficient evidence that

> . . . this local focus of infection should be regarded, not only as a portal of entry but also as a site at which organisms multiply and develop their virulent properties and perhaps, as Rosenew suggests, acquire specific pathogenicity and affinity for certain tissues (5).

> When it is considered that the gingivae are delicately responsive to almost every type of perverted function, such as dietary deficiency, dysfunction of the internal secretory organs, blood dyscrasias, and infectious disease, it becomes readily apparent that, through their loss of resistance, they may offer an excellent environment for the growth and multiplication of the ever-present bacteria, particularly the anearobes (6).

Systemically, there is much well substantiated history of disease from gastro-intestinal pathology through blood, lungs, and heart to an infinite number and variety of human illnesses.

No part of the human body then, can be entirely free from this vicious influence of infection from the mouth. To some extent, this influence is graphically illustrated in the well known Clark chart.

The Curriculum Survey Committee of the American Association of Dental Schools states in an exhaustive report, "the mouth is obviously the site for the begin-

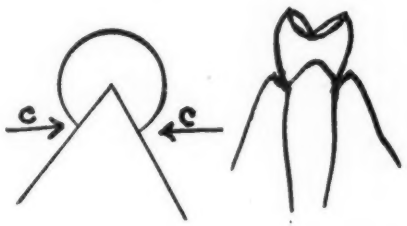
ning of many infectious processes" (3), while the late Dr. Charles Mayo claimed that 87 to 90% of us suffer from some simple infection, that 90% of these originate above the collar line and mostly in the mouth, and that the "future of medical science rests with the dentists who can stop or kill the germs as they develop in the mouth."

Responsibility for all this accumulated destruction rests then, with the processes and products of decomposition in the oral cavity. Experience has shown the writer that these products are tangible elements and can be controlled, and that the energy created by mild friction, an agitation or activity applied to the cervical areas of the teeth is not only quite sufficient to cleanse these tissues from the harmful accumulating diseased products, but will also tend to create in the periodontium a state of vigor and health, the only safeguard against disease. In this way a quality of tissue tone can be developed that will serve as a resistant defense barrier against the ensuing vicious cycle of destruction which begins innocently enough in the mouth and ends so disastrously. "The keynote of saving one's teeth regardless of all mouth corrections is stimulation of the gums" (7).

In order to evolve an instrument that will function skillfully and positively at the areas of decomposition, one must understand the environment and the nature of the tissues involved and their anatomical relationships.

Let us consider first the general outline of the supporting structures of the teeth; that is the alveolar bone, other periodontal tissues, and mucous membrane. These arch shaped investing tissues are superimposed horizontally and support rows of teeth which form, as they follow the inner cheeks, buccal vestibules or vaults; very narrow but quite high corridors, at the bottom of which, posteriorly, lie the protruding external oblique bony mounds. Furthermore, each arch is individually composed of consecutive mucous membrane and tooth segments following each other in picket fence regularity.

In the interproximal areas where the segments meet, the mucous membrane is protruded and forms a triangular mass, the septal gingiva or dental papilla. To understand clearly this anatomical relationship, it might be best described as a ball superimposed over a triangle (Figs. A1 and A2). This ball or tooth crown is hard, while the triangle or gingival mucous membrane is



Figs. A1 and A2. Simplified outline. (C. Cervical.)

comparatively soft and forms a lip or mound at its crest where it hugs the under side of the ball at its smaller circumference. This narrowing junction forms, unfortunately from a prophylactic viewpoint, indented, undercut areas analogous to the cervical region.

On the lingual aspect these indented areas are almost hidden from sight by lingual contours and by being obstructed and sheltered as cliff-dwellers are, by high precipitous walls (the occlusal height) that must be surmounted to reach these areas for any kind of instrumentation on them. Furthermore, the arterial blood flow that supplies health to these vital dental tissues comes from the root direction. The blood vessels anastomose at the crest of the mucous membranes and up into the papillae. These tissues are end-organs and the venous circulation that carries the poisons away from these crests and papillae, starts at their very peak.

The relation of these varied surfaces to each other, their different densities, and the direction and height of the venous flow, practically dictate the position and attitude that bristles of a prophylactic instrument (toothbrush) must assume and the height and direction of a truly functional stroke necessary for the efficient stimulation and cleansing of these vital tissues. This complicated, though normal anatomy, presents in itself a sufficient problem in hygiene, but there are further difficulties to be encountered in the many *irregular* surface relationships which malposed teeth and mucous membranes often assume.

IRREGULARITIES OF THE TEETH

1. Greatly tapered.
2. Torso version positions.
3. Buccal or lingual displacement or inclination.
4. High anteriors, particularly high crowns in general, make lingual gingival area attention almost impossible.
5. Narrow arches.

IRREGULARITIES OF THE MUCOUS MEMBRANE

1. Narrow buccal corridors (upper and lower).
2. Tuberosities (shelf-like) prominent.
3. External, oblique prominences involved with the over-lapping of the masseter muscle in the posterior buccal vestibules (on mandible).
4. Upper heavy anterior palate. Heavy palatal tissues obtusely angled in general are a serious handicap to proper lingual cervical attention.
5. Areas of deep gingival recession (requiring deeper interproximal attention).

In orthodonture the difficulties and barriers present are even more formidable. The many malposed enamel and mucous membrane relationships complicated further by the presence of bands and arch wires, are obstructions no toothbrush bristles can hurdle over. In the narrow arches often seen, attention to lingual vital areas is practically out of the question. The much needed stimulation attained during this complicated physiological process is almost negligible. It is a serious responsibility to subject a child to the absorption of the bacterial products constantly present around inflamed gingivae during the long and trying period of orthodontic treatment.

But, regardless of any normal or abnormal relationship of tissues to each other, all debris tends to settle at definite regions of the mouth, towards the cervical-third tooth area.

It is this truth and also the fact that the upper portion of the crown by the same natural forces is essentially free from decomposition that must be considered in our prophylaxis. This most important behaviour can be quite clearly illustrated by the use of disclosing solution on the teeth of most patients.

Thus the mouth may be divided for prophylactic purposes into two types of areas, the accessible and the inaccessible. The accessible area consists of the enamel surface convexities, the cusps and the buccal and lingual surfaces. These surfaces receive friction continually, in a saliva medium, by the muscular movement of the cheeks, lips, and tongue, and by the masticatory forces. They are generally free from dental caries. This most desirable energy (frictional mobility) does not and cannot occur where it is most needed, at the cervical, because of the tapered, indented, pocketed, and altogether inaccessible mucous membrane and enamel anatomy that nature has formed here. It is rather *into these areas* as receptacles, that the energy of frictional mobility, gravity, and careless toothbrush attention sweeps the debris. "The surfaces of the tooth may be perfectly clean and polished while the gingival crevice is filled with a mass of decaying food debris, calculus, bacteria, etc." (8). (Fig. B.)

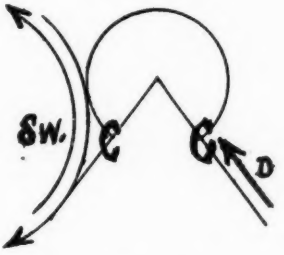


Fig. B. SW, Sweeping strokes regardless of direction are resisted and prevented from reaching the indented cervical anatomy C by the surrounding protective high spots of the hard and soft tissues. D. Indented areas of any kind must be approached in a direct manner. C. These are the areas where the tragedies occur. (Indented and sheltered cervical zone.)

The tapering of the teeth to these regions and their approximating mucous membrane lip which tends to hug these narrower circumferences, are invaluable in nature's scheme to protect the crevicular ligament by pocketing it at this junction. This ligament, the most resistant of all mouth tissues, unfortunately is quite vulnerable to the approximating debris sediment and its disintegrating processes. This whole cervical crevice [gingival sulcus] anatomy —the gateway to the health of all the supporting tissues, is further protected by nature's exquisite expanding bulges of the tooth crown, in all directions, which

creates a shed or protecting buttress, thereby shunting the food away at harmless angles during active mastication. In the tooth brushing process, it is this bulge of the crown acting much the same way that tends to shunt bristles away and to prevent them from reaching in and around cervically, axially, and interproximally.

The shortest, most direct, and unhampered pathway to this area follows along under the convexities of the crowns of the teeth along the mucous membrane angle to its termination, the papillae crest.

The cervical therefore, can be most efficiently reached with a brush stroke along this simple, direct line. Moreover, the narrower the circumference of a tooth is, the easier a direct bristle approach will function at and around its cervical embrasures without obstructing forces. It is known that nature has concentrated her vicious bacterial growths in this region and that the beginnings of most all periodontal disease starts here. It is at these cervicals that foci of infection are born. These regions then, are the most vital areas of the mouth as regards hygiene, health and prophylaxis.

Let us remember that the venous circulation starts at the crests of the papillae in these regions. It is at these intricate cervical areas then, that we must enforce our prophylaxis. Correct hygiene of the oral cavity is essentially cervical hygiene.

Dentistry has practically accomplished the ultimate in both orthodontic and in restorative mechanisms. Yet, hygienically, this has only added difficulties to our problem. Myriads of bands, saddles, and sluiceways; margins galore, many ending at the cervical, in and around the crevicular area, tend to aggravate further gingival pathosis. No other phase of dentistry has been treated so indifferently as prophylaxis has been by the profession at large.

There is no more neglected field in the entire realm of preventative medicine than that of diseases of the gingival tissues. Practically every patient who seats himself in a dental chair, exhibits some form of morbid gingival pathology, or has frank gingivitis. The present lowly status of gingival prophylaxis and therapeutics is difficult to understand in view of the fact that the gingivae are perhaps of all human tissue, the most frequently infected (6).

Caries, sensitivity, recession, g i n g i v a l stagnation in its many varied disease forms, and bacterial activity are the general rule. Poor hygiene is more than prevalent throughout the constricted buccal corridor. Incipient periodontoclasia is forever present. Interdentally destruction runs rampant. The breaking down of the lingual vital areas, particularly in the posterior region, is due mostly to inaccessibility. "Therefore, the pocket formation is most frequently found in the approximal spaces and on the lingual surfaces of the teeth, especially of the molars and bicuspids" (8). Merritt emphasizes the cause of posterior lingual pockets to be the inability to attain correct hygiene.

Hirschfeld says,

Since it is generally recognized that the lack of interdental hygiene is largely responsible for the predominating interdental caries and periodontal diseases, the extreme importance of thorough interdental hygiene cannot be over-emphasized (9).

This whole interdental pathology will continue as long as we use inefficient and inexact interdental stimulating and cleansing mediums and methods.

Regardless of how well our operative treatment to establish oral health has been performed, we are completely dependent on our patient's coöperation and the efficiency of the brush instrument used to maintain this health, otherwise the gingival cells will become reinfected unless cell resistance is maintained by gingival stimulation (10). If any part of the circumferential cervical mucous membrane, buccal, lingual, or interproximal, fails to receive its share of stimulation to the height of its crest, or fails to do its part towards contributing health to the structures as a whole, the dental apparatus will suffer and mouth hygiene will fail. There must be no weak link in the entire cervical chain.

Sorrin compares this necessary, vigorous health maintenance to the third leg of the tripod doing its share in supporting the whole periodontal structure.

Such a state of health is not easily won. It certainly cannot be accomplished without a correct application of the important principles inherent in bristles and cleansing processes in general. As a matter of fact, these principles have been applied with more ingenuity to brushes for cleansing of fingernails, venetian blinds, coffee percolators, bed-springs, glassware, and commercial products on the whole, than has

ever been correctly applied towards our infinitely more important problem of dental health.

PRINCIPLES OF BRISTLE BEHAVIOR

The first principle of bristle behavior is that bristles in order to be effective, must function with their point ends against the objects to be cleansed.

BRISTLE RESISTANCE

The second principle, that of bristle resistance, must be more fully understood. For instance, many of you have had the simple experience of sensing in finger nail brushing, a lack of "under the nail cleansing." Instinctively, you moved the whole brush out of the way and managed to manipulate the end tufts alone into position, directly under the finger nails, and were pleased at their effectiveness and startled at the penetration of these bristle points in function, and were amazed at the same time, what little pressure was needed since the obstructing or resisting bristles were moved out of the way; or in other words, bristle resistance done away with. This bristle resistance, is the end force always present in functioning bristles, but dependent on the mass, texture, length of the bristles, and the force applied.

Bristles may be compared to bundles of fine toothpicks. If you force your finger over the sharp point of a tooth pick, it will resist, finally puncture and draw blood. Bundles of bristle fibres act essentially the same way. The ends are minute pointed instruments and can do much harm.

One can test this resistant force actually present in the bristles themselves, by pressing the thumb directly against their ends. This resistant force, normally very great is lessened somewhat in function when the bristles are flared but nevertheless, it is always present. This end pressure also suggests the great amount of force that must be exerted in many of the toothbrushing methods of today, to overcome the ever existing resistant force before the bristles themselves can actually reach their functioning position. This force as it manifests itself in the conventional toothbrushing process, in the bristle end approach, especially at and around the cervical regions, is a contradictory force because it interferes with a simple functioning position of the instrument to this cervical anatomy and makes it impossible for the patient to sense what is taking place and to what degree.

Force per se must never be used at or around the cervical tissues. What is needed is a mild agitation, and plenty of it, to cause movement and activity to prevent stagnation at the particular point.

It is the amount of friction and not its harshness which strengthens the tissues. The process is gradual (11).

Furthermore, the exertion of this bristle pressure as the brush is swept from area to area in an effort to maintain continual close contact between the bristles and the indented cervical region tissues, is largely responsible for wear, trauma, recession, and much mouth havoc. This contradictory force continually interferes with the whole hygiene process. Moreover, excessive pressure is a deciding factor in rendering bristles inert and quickly destroys their usefulness.

BRISTLE ADAPTATION

The third principle in any cleansing process is that of adaptation. For a cleansing process to be effective, the bristles must be closely related to the outline of the object. The design then, of any instrument to do the intricate work in and around the cervical areas of the teeth should be so inherently related in shape and form to these tissues that it will permit a harmonious adaptation to the tissue outline, thus minimizing the force needed to maintain this adaptation as it is guided from area to area. It must be remembered that bristle points are minute sharp instruments and must not incise at any time or in any position the keratinous layer of the gingivae (12). The tooth crown alone is hard enough to withstand the bristle point thrust.

ACCESSIBILITY

The fourth principle is applicable to all general cleansing processes. In order for cleansing to be complete, all parts and surfaces of the object must be reached with equal facility. Heretofore, the complete hygiene of the mouth, that is of both the accessible and inaccessible areas, has been attempted by the conventional straight tooth brush. As a matter of fact, the same procedure is in general use to do both the superficial cleansing of the more accessible surfaces and the more intricate hygiene at the cervical. This fourth principle then, stands between the precious invaluable gingival tone and the present oral hygiene lethargy.

DEFECTS OF THE STRAIGHT TOOTHBRUSH

The conventional straight toothbrush is effective in general cleansing of the teeth but mostly limited to the externally exposed and buccal surfaces. This toothbrush so habitually and completely advocated, and we might add tolerated, by the dental profession to perform the complete hygiene of the mouth, is in no sense an outgrowth of the scientific application of dental experience. The straight toothbrush is a hang-over from the days when longer brushes were used to scrub the outer enamel surfaces of the crowns of the teeth, for appearance only. In those early pioneer days, very few thought of the importance of the health of the gingivae and most certainly did not relate the many bulky forms of brushes used to this important function.

Within recent years there has been a great effort to correct this. One may find toothbrushes of many shapes and designs on the market. Dr. Hartzell's introduction of a series of various shaped brushes is an acknowledged step toward the solution of this involved problem. Most illustrations used to demonstrate how straight brushes should be manipulated, in an effort to encourage cervical function, show many irregular traumatizing resistant positions and inconsistent angles, particularly in the difficult manipulation at the lingual cervicals. There is a complete lingual cleansing failure.

Hirschfeld explains "this lingual failure in the Charter method because of the impossibility of paralleling the bristle rows of the straight toothbrush horizontally to the cervical tissues." The attempts to teach the average person the many difficult bristle and mucous membrane positions have often led to failure at and around these regions.

Smith explains ineffective hygiene,

> as the result of extensive advertising of pastes and powders as germicidal, obscuring the more important issue of toothbrush design and its correct manipulations (14).

The interproximal portion of the gum is the most important from a periodontal standpoint and it is impossible to stimulate it adequately when teeth are brushed with a sweeping motion. Stimulation of the gingiva will result only when the sides of stiff toothbrush bristles are pressed firmly against it, and the capillary blood is forced out of the vessels (10).

Hirschfeld exposes and profusely illustrates the dangers to the mucous membrane and enamel by most of the toothbrush methods used today. A great deal of harm has been done to these tissues by the various strokes. He lists and most beautifully illustrates no less than eight different gingival lesions resulting from toothbrush trauma (9).

He divides the causative or predisposing factors of toothbrush trauma and recession into three groups: "A. The abnormalities of the dental arch. B. Improper tooth brush technique. C. Faulty tooth brush."

The summing up of all the foregoing, points to the conclusion that the outstanding defects of the conventional tooth brush as a functioning medium for the cervical anatomy are these:

1. Layman cannot sense what is taking place.
2. It has practically no lingual vital area possibilities, (no parallelism).
3. Too much bristle resistance. The greater the number of rows, the greater the resistance to the cervical.
4. Difficult to manipulate in the narrow buccal vestibules, posteriorly.
5. Encourages the use of force and generally too loose and too free a movement.
6. The positioning of the bristles is left entirely to the layman.
7. Practically no design relationship to the vital area. Encourages bristle point trauma.

It would seem then, that the limitations of the straight toothbrush should be more completely recognized so as to encourage the use of other instruments designed to meet the complicated requirements of the oral cavity with its varied angles and different tissue densities.

TOOTHBRUSH DESIGN RELATED TO FUNCTION

To understand more fully, design related to function, let us consider the care and understanding applied in the construction of any of the recognized periodontal instruments and see what it is that effects their easy and exact positioning. These instruments are designed to function only in and around inaccessible cervical areas. The angle, the length, and the shape of the shank permits the blade to reach from the occlusal over the high bulging, obstructing walls of the tooth crown without force and

to go down to make close contact with the deeper cervical areas, even in the difficult lingual approach. This is scientific designing. It takes environment and experience into consideration (Fig. C). The same skill

Fig. C. Shows shank principle in periodontal design in relationship to the height of the tooth.

and understanding should be applied in designing a toothbrush. The substitution of a short row of rather full bristles, graduated in length, for the cutting blade of a periodontal scaler, would accomplish in a toothbrush the same inherent capabilities that these precise cervical instruments possess. This is exactly what our problem is: the transition from an operative instrument designed for the cervical to a brush instrument designed for the same environment.

Since the cervical area anatomy buccally, lingually, and interproximally, in any part of the mouth, has the same geometric, anatomic form, and is the same distance from the occlusal, then a brush head adapted to the end of a shaft, at least as great as the tooth height so as to reach from the occlusal level one cervical area, (with the bristle row lying parallel to and along a predetermined mucous membrane angle), will be able to reach similarly *all* such vital areas, with equal facility at any part of the mouth. The horizontal paralleling of the bristle rows will be as positive on the lingual as on the buccal (Fig. D).

Fig. D. The same shank design applied to toothbrush design.

The area covered by a single bristle row of sufficient mass and of the proper texture, barely flared at gentle functional pressure, including the additional area covered by the small circular oscillation brush movement, is sufficient to cover the essential areas of the mouth segment up to and beyond the greatest convexity of the tooth crown.

The chief value of this design is that at all times during the complicated massage and cleansing process, the sides of the bristles will lie full along the mucous membrane angle and upon the papillae, in a non-irritating manner, while the ends, hard and sharp as instruments, find their proper use against the tooth enamel only. This tends towards an ideal harmony between complete adaptation and its accompanying functional energy.

Just as force and incorrect instrumentation bruise and mar in periodontal scaling the thin cementum surface, so do we produce injury at the cervical in our brushing processes when there is a confusion of contradictory forces.

This brings us to an important principle in any cleansing massage process where vital tissues are concerned. In order that the parts remain in a state of health and are not traumatized in the process all the values of friction, resistance, and adaption must be in such harmony that an effective dynamic, massage-cleansing process will result with a minimum of tissue trauma and a minimum of instrument wear.

The layman, often with no manual dexterity whatsoever, must be given every opportunity to maintain and to continue our professional prophylactic standards. No method will have much value at the cervical areas unless the patient's prophylactic instrument (toothbrush) is related in design to periodontal instruments. A dental prophylactic instrument then, has an important function to perform. It becomes the dentist's assistant and must be so designed that it can cope successfully with its problems.

The advantages of such a scientifically designed toothbrush for cervical hygiene would be:

1. Bristle rows will always function parallel and identically to the gingival cervicals at any part of the dental structure both lingually and buccally.
2. The short, single row and graduated bristle-length brush head would cut bristle trauma to a minimum and function interdentally.

3. The approach of the bristle ends, the toughest and cutting part of the bristle, functions directly against the hard enamel only, at all times. The sides of the bristles would maintain their non-irritating massage position on the adjacent mucous membrane in ideal positioning.
4. It is highly probable that meticulous attention to the cervical interproximal, may obviate the great destruction of tooth crown tissue in the common practice of extending approximal inlay margins deep down under the free gingival margin for prophylactic extension.
5. The gingival approach is more direct, eliminates almost all resistance, and can be reached by a shorter bristle length.
6. The shorter length has more possibilities in the narrow but high rectangular buccal corridor.
7. The explanation to the layman on the functioning of such an instrument, would awaken a comprehensive view of the vital areas and their importance to mouth hygiene and would contribute in no small measure to a broader health consciousness.
8. The functioning life of the bristle is prolonged because each bristle-head functions for one half of the mouth only; the lesser resistant path and lack of force greatly prolongs the texture life, also.

No single head in either an operative or prophylactic instrument design can effectively reach all the intricate anatomy of the oral cavity. The complete transition from the periodontal instrument design to the brush instrument is accomplished by the development of a right and left contra-angle bristle head running parallel to each other and parallel with the handle.

All these related values from the horizontal cervical area to the bristle row broadside, through to the handle alignment complete a well coördinated cycle; from design adaptation to horizontal positioning. There is no end to what might be accomplished in tissue resistance with such exquisite harmony of adaptation and alignment.

The advantages of functioning at such proximity are many. The much abused and obscure areas in the posterior regions lingually, as well as bucally, will be helped materially by the complete adaptation of the brush to the anatomy, and the intelligence with which the patient senses this adaptation. The lingual vital areas for the first time in dental experience will be treated adequately.

The frictional energy that must be transmitted is accomplished with more skill than brawn. This energy is distributed equally to all the elements in the cervical areas. *The use of force is absolutely contra-indicated.*

The type of friction to the tissues and the brush movement follow patterns determined by much periodontal experience with the various elements in mouth environment. The character of the brush instrument is entirely a specific one, the nature of its movement is confined to a limited area and follows that of the Charter embrasure to embrasure manipulation; with this modification, that the brush to fissure adaptation, being automatic, resistance is reduced to a minimum, and no force need be used. The small gyration or oval movement limited to bristle flexibility must be applied definitely with a rather gentle energy. Any slight movement regardless of direction will encourage the sharp bristle points to act like instruments and to bite into, break up and dislodge the adherent debris layers and other products of bacteria; at the same time the bristle side contacts and stimulates the gingiva.

ORDER IN PROCEDURE IMPORTANT

The value of order in moving the toothbrush from one area to the next, using the dominant median line as a starting and finishing position, cannot be over-emphasized. It facilitates the sequence, encourages observation, thoroughness, and creates for the patient a definite sense of prophylaxis.

The recommended procedure follows:

1. *Left side*
   (a) Labial and buccal—upper and lower simultaneously (Fig. 1).
   (b) Lingual—upper (Fig. 2).
   (c) Lingual—lower (Fig. 3).
   Thorough rinsing of the mouth.
2. *Right side*
   Follow same procedure as the left side, through Figs. 1, 2, and 3.
   Thorough rinsing of the mouth.

Fig. 1A. Median line starting position for simultaneous labial and buccal cleansing.

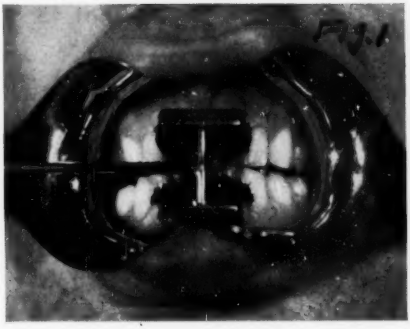


Fig. 1B. Is actually a simultaneous gingival and enamel technique I worked on some time ago, but it will illustrate for you the anterior starting position.

METHOD OF TOOTHBRUSHING

The handle position is essentially always horizontal.

Left side:

(a) Labial and buccal, upper and lower, (Fig. 1).

Begin at median line position. Handle

Fig. 2A. Front view. Median line starting position for the upper lingual cleansing.

Fig. 2B. Lingual view. The upper head is behind the upper anteriors.

horizontal and extended out sideways. With the teeth together, the brush is positioned so that the bristle heads take their respective cervical places at the median line. Vibrate or gyrate following the Charter meth-

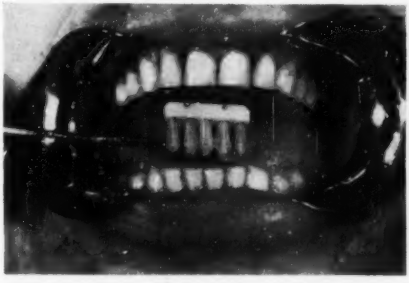


Fig. 3A. Front view. Median line starting position for the lower lingual cleansing.

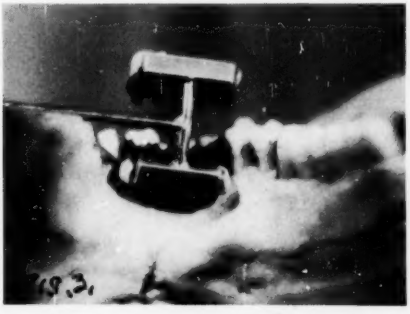


Fig. 3B. Lingual view. Lower bristle head in position behind the lower anteriors.

od of manipulation, and carry the brush posteriorly through the cuspid, bicuspid, and molar regions, using the same massage and cleansing stroke action. From its most posterior position in the molar area, the brush must now be manipulated and returned to the median line position in Fig. 1, but this time using a slightly larger oscillation to cleanse more of the enamel contour.

(b) Lingual—upper (Fig. 2).

Change the brush from position 1 horizontally into position 2, behind the upper anteriors. Starting at the median line manipulate the brush, Charter method, from area to area (cuspid, bicuspid and molar), and then back to the median line (Fig. 2). In this position the upper or functioning brush head is on the upper level behind the upper linguals, while the lower brush head is free in space and does not function. The slightly larger oscillating movement is used on the return stroke.

(c) Lingual—lower (Fig. 3).

From position 2, behind the upper anteriors, lower the brush, maintaining its horizontal position, so that the lower bristles find their position down behind the lower anteriors at the cervical level, while the upper brush head is now free in space, as in Fig. 3. Manipulate and gyrate the brush, Charter method, from the lower median line position through the various areas and back again using slightly larger oscillation, when returning to the median line. Complete the rinsing.

It will be noted that a more general technique has been followed when brushing the upper and lower labials and buccals simultaneously, whereas, on the linguals the specific attention to one area at a time has been recommended. In any variation from the normal gingivae, however, the specific technique should be adopted for these areas also.

Right side:

The right labials, buccals, and linguals must be subjected to the same laws of adaptation, movement, and agitation, embrasure by embrasure, following the same order as described for the left side, through to the final rinsing.

Occlusals:

The occlusals present grooves and fissures and valley-like formations. They are best approached as in Fig. 4. A single row penetrates directly to the bottom of these bicuspid and molar fissures. The brush as heretofore follows the same horizontal alignment with the exception, that in the occlusal fissure cleansing both bristle heads are on the same level, with one head functioning, and one free in space, but laterally (Fig. 4).

It is important in any technique to visualize clearly and grasp the manner of it, hence it is of paramount importance to give our patients a basic understanding of the technique of toothbrushing by instruction through the simple key positions. This can be accomplished by confining the first lesson entirely to the exterior areas and in-

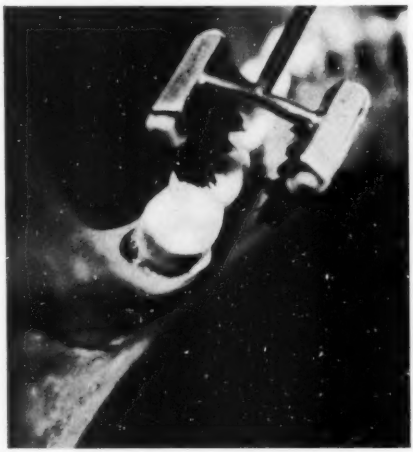


Fig. 4. Occlusal. One bristle head in occlusal fissures. One head free in space and laterally.

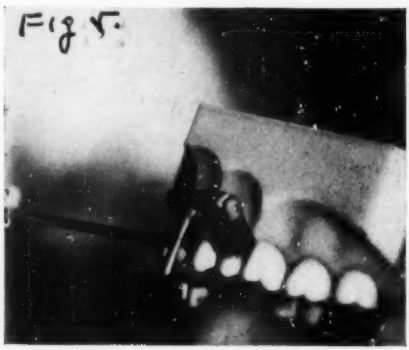


Fig. 5. Shows the relationship of the bristle side angulated to the mucous membrane for the ideal massage. The bristle points project to and in and around the cervical enamel.

Fig. 6. Lower right lingual cervical adaptation. (Bicuspid and molar region.)

Fig. 9. Study of the lower lingual anterior section. Upper free head cut away to expose bristle adaptation.

Fig. 7. Upper left lingual cervical (bicuspid region.)

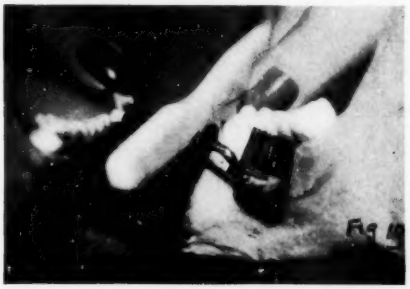


Fig. 10. Comparative study of bristle relationship to vital cervical areas on the lingual. The free head cut away to expose bristle adaptation.

Fig. 8. Shows the ideal relationship in the buccal corridor region.

structing the patient in the use of the brush in key positions 1, 2, and 3, for both left and right side approach. These exterior positions hold the clue to the whole process. The patient should master these before being permitted to explore the more obscure and hidden environment of the mouth interior. These fundamental observations will solidify the single horizontal idea throughout and will serve to guide the patient towards a procedure that will go far to change what has been for the most part a haphazard and chaotic approach to oral hygiene into an orderly and positive one.

Periodontists have long concerned themselves with these problems and have approached closely the fact that the process of health is essentially a prophylactic one. Pyorrhea can be prevented and cured in every instance in which we can control the growth and invasion of these pyogenic organisms. Also, if the necks of the teeth adjacent to the soft tissues are kept sufficiently free from bacteria and the soft tissues daily stimulated by friction and pressure, no . . . pyorrhea can exist (13).

It is a difficult thing for the average dentist to jump the mechanics of dentistry on which his livelihood depends, and which has absorbed much of his thinking, to the clear visualization that bacteria, which play no obvious part in dental rehabilitation, are nevertheless of primary importance to the health of the patient.

There is so much accumulated knowledge relating to bacterial life in local and systemic disease that we must now enlarge our professional scope by augmenting our high technical skill with a definite prophylactic technique commensurate with the seriousness of this problem of oral health.

The whole approach is only in its infancy. It is a professional duty to further as much as is within our power, greater consciousness towards this particular basis for health. It is to be hoped that oral hygiene can be further advanced and that some of the principles here involved will serve to open new horizons.

113 West 57th Street

REFERENCES

1. Stewart, F. E.: "Bacteria and Systemic disease." *D. Cosmos*, 1916.
2. Merritt, Arthur H.: *Periodontal Diseases*, Macmillan Co., New York, 1930.
3. Blanquie, Raoul H.: "Periodontia Past and Present." *J.A.D.A.* 26(8):1353-59. Aug., 1939.
4. Cogan, John V.: "Relation of Gingival Infection to Arthritis." *J.A.D.A.* 26(1):56-60. Jan., 1939.
5. Meyer, Karl A.: "Oral Infection & Gastro Intestinal Disease." *J.A.D.A.* Jan., 1940.
6. Belding, P. H. & Belding, L. J.: "Gingival Infection and Resistance." *J.A.D.A.* Apr., 1938.
7. Charters, W. J.: "Prevention of Systemic Disturbance by the Toothbrush." *J.A.D.A.* 26(5):784-86. May, 1939.
8. Salvas, J. Clarence: "Importance of Early Recognition and Treatment of Periodontoclasia." *J.A.D.A.* Mar., 1938.
9. Hirschfeld, Isador: *The Toothbrush. Its Use and Abuse*. D. Items of Interest. Pub. Co. Bklynn, N.Y.
10. Tishler, Benjamin: "How to Educate the Family Dentist in Periodontia." *J.A.D.A.* Mar., 1938.
11. Smith, T. Sidney: "Physiological Conditions Governing Use of Toothbrush." *J.A.D.A.* June, 1940.
12. Leonard, Harold J.: "Conservative Treatment of Periodontoclasia." *J.A.D.A.* 26(8):1308-18. Aug., 1939.
13. Hartzell, Thomas J.: "Important Factors; Control of Periodontoclasia." *J.A.D.A.* 14. 1927.
14. Smith, Rowe: "Fads in Periodontal Treatment." *J.A.D.A.* 26(8):1318-24. Aug., 1939.

Supplement to the July, 1943, Issue of the *Journal of Periodontology* will be published in October.

The above Supplement will include the "In Our Opinion" Department and this will carry a discussion of the question, "What is a Periodontist?"

Dr. Harold J. Leonard announces that eleven Academy members will be invited to take part in the discussion. This will surely prove interesting. Look for it!

Two Cases of Subgingival Proliferative Lesions of Probable Hormonal Origin

By DANIEL E. ZISKIN, D.D.S.
AND
HERBERT F. SILVERS, D.D.S., *New York City**

A REPORT of two cases of hypertrophic gingivitis referred to us for treatment because of their probable hormonal character and their recalcitrant history.

CASE 1.** An 11½ year old white female, presented with hypertrophy of upper and lower alveolar gingivae (Fig. 1).

Complaint. The patient complained of marked enlargement, easy bleeding, and unaesthetic appearance of the gums. She was especially concerned with the prognosis since previous treatment had been unsuccessful.

Medical History. The medical history was negative except for chronic post-nasal purulent discharge. Patient had not yet begun to menstruate. Her nutrition, having been regulated previously, was adequate.

Dental History. The lesion had been present for about two years, previous treatment having been as follows: locally, gentian violet had had no effect; surgical removal resulted in recurrence; vitamin C and other vitamin therapy produced no improvement.

Medical Examination. Physical examination, including gynecological, was negative, except for a slight cervical and submaxillary lymph node involvement.

Laboratory Findings. Blood was normal except for a slightly elevated P.M.N. count. A prolan evaluation of urine found it negative. A vaginal smear showed that the estrin effect was diminished. The gingival smear coincided with vaginal smear. The sedimentation rate was normal.

Dental Examination (Gross)—Patient had a normal twelve year complement of teeth, with slight irregularity upper and lower, in the cuspid and bicuspid regions. Food debris around teeth was slight. Mucous membrane was normal in color and appearance. There was a marked hypertrophy of the gingivae involving all of the interdental papillae both labial, buccal and lingual, and in some instances, covering half the crowns of the teeth. The upper gingivae were involved to a greater extent than the lower. The hypertrophy consisted of a proliferation tissue emanating from both the gingival crevice and interdental papilla, which could be lifted easily from the tooth surface. Most of the hypertrophy was on the labial and buccal gingivae and presented a bright red, spongy, intensely inflamed surface, growing in grape-cluster form and pushing back the alveolar gingivae a distance of 8 to 10 mm. This tissue bled easily with the slightest trauma.

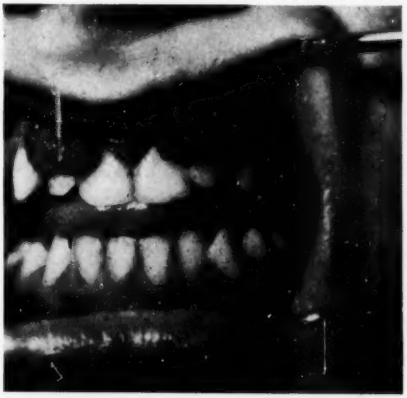


Fig. 1. Case No. 1. Pre-treatment state. Note hypertrophy which was bright red, hemorrhagic, and could be lifted easily from teeth.

Radiographic Examination. Evidence was seen of slight resorption of the alveolar crest, especially in the molar regions.

Microscopic Findings. The epithelium in the alveolar gingivae had lost its keratin layer and in one portion the epithelium was absent. There was marked hyperplasia,

*School of Dental and Oral Surgery, Columbia University
**Case was referred by Dr. John Oppie McCall of the Guggenheim Dental Clinic, who made a tentative diagnosis of "hormonal gingivitis."

evidenced by an increased number of nuclei, downgrowth with pointing and splitting of rete pegs and proximity of papillae to the surface. Evidence of edema was also present. There was edema of the corium with gross inflammatory exudate in the proliferative corium. The papillae contained capillaries filled with red blood cells. The papillae and subpapillary tissue were heavily infiltrated with wandering cells, chiefly plasma cells, and lymphocytes, some of which had migrated into the epithelium. There were also many leucocytes present. The process extended well down into the submucosa but ended before the deepest part was reached (Figs. 2 and 3).

Treatment. (1) repeated prophylaxis with subgingival curettage resulted in some improvement, but there was recurrence; (2) surgical removal and trichloracetic acid cauterization was followed by recurrence; (3) vitamin therapy (cod liver oil, B complex, vitamin C), produced no improvement; (4) x-ray therapy consisting of a total of about 1200 r to each field of gingivae, in sittings of 3 to 5 minutes, approximately 200 r per sitting. The latter form of treatment seemingly changed the lesions to a more normal appearance. However, they remained hemorrhagic, and on cessation of treatment gradually assumed their previous state. (5) Quinine-urea (schlerosing solution) was injected into some areas. Most of the solution leaked out of the tissue owing to its spongy character, but some improvement was noted. Regression occurred soon after cessation of therapy (Fig. 4).

(All of the foregoing methods were used in an effort to obtain "leads" as to diagno-

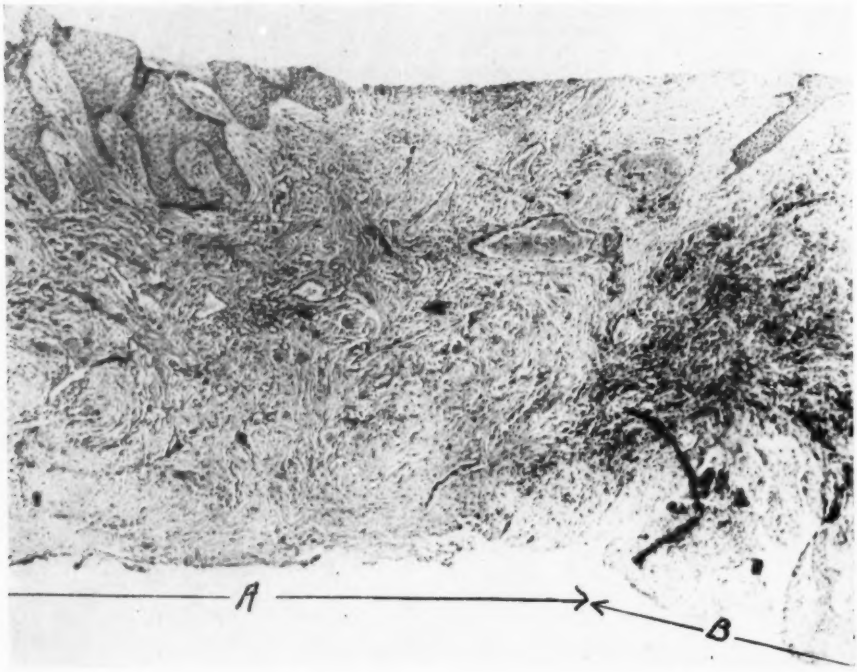


Fig. 2. Case No. 1. Female, white, age 11½ years. Biopsy from upper right No. 2 interdental papilla prior to treatment while under our care. X75. This section shows tissue at about the point where the crest of the interdental papilla was pushed back by outgrowing proliferative tissue. (A) Portion of alveolar gingivae; (B) beginning of proliferative tissue. The epithelium in the alveolar gingivae has lost its keratin layer and in one portion the epithelium itself is absent. There is marked hyperplasia evidenced by increased nuclei, downgrowth with pointing and splitting of rete pegs and proximity of the papillae to the surface. There is some edema of the corium with gross inflammatory exudate in the proliferative corium; the papillae and subpapillary tissues are heavily infiltrated with wandering cells, chiefly plasma cells, and lymphocytes, some of which have passed into the epithelium. There are many leucocytes present. The process extends well down into the submucosa but ends before the deepest point is reached.

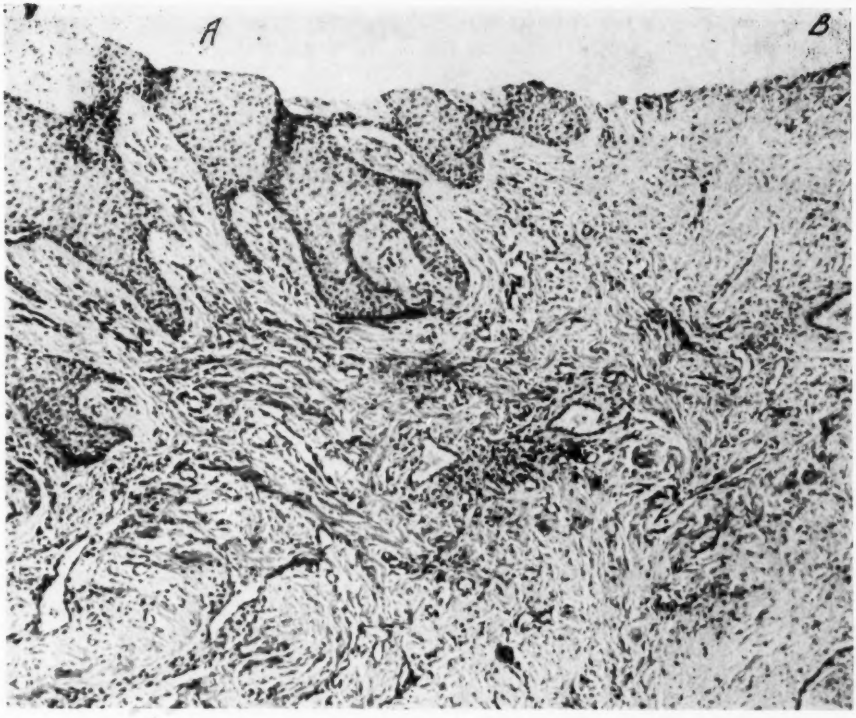


Fig. 3. Case No. 1. High power of Fig. 2. X115. (A) Alveolar gingivae; (B) proliferation tissue.

sis). A tentative diagnosis of "hormonal gingivitis" prompted the following treatment on a local basis: (6) deep curettage (in order to break up the granulations), consisting of carefully introducing instruments to the depth of the pocket or crevice formed by the new growth and of severing its attachments. The patient was instructed in the use of the toothbrush and in interdental massage with rubber point and toothpicks. A careful checkup on the home hygiene of the mouth was maintained. The deep curettage, pursued at regular and frequent intervals, plus thorough home hygiene, produced a gradual reduction in the amount of hypertrophy.

Fig. 4. Case No. 1. Condition after x-ray and schlerosing solution treatment. Note improvement which soon regressed to condition similar to Fig. 1.

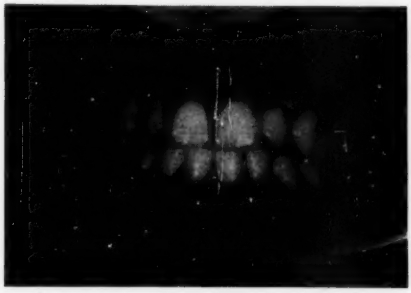


Fig. 5. Case No. 1. Condition after curettage and hormone treatment and continued home hygiene. When regression occurs, it is slight and easily controlled.

In the course of six weeks, during which time the patient was seen and treated approximately twice a week, the tissue became almost normal for the first time in two years. Small recurring hypertrophies, appearing occasionally, were easily controlled (Fig. 5). It should be noted that menstruation began about one month after our treatment was instituted.

The desquamated areas did not respond to the curettage and home care. These procedures were augmented by topical applications of estrogen (estradiol benzoate-Progynon B, Schering) in ointment form.

The patient was given approximately one tube of ointment per week for home use. Each tube contained 25 gms. (1,000 R.U. per gm.). This was applied twice daily by smearing on gingivae and allowing it to remain indefinitely. The desquamated area healed. The Progynon treatment was continued and is still being used as an adjunct to the instrumental therapy.

Comment. Approximately 1,250,000 R.U. of Progynon were applied by the patient and by us in the clinic in the course of a year. Of this, only a small amount, difficult to determine, remained on the affected areas and an even smaller amount was absorbed. Most of the improvement was obtained by means of local curettage and home care. With the introduction of the Progynon ointment the results were better in that new proliferations were not as frequent and were easier to control. In evaluating the effectiveness of the hormonal therapy, the questions of spontaneous recovery due to increasing age, or onset of menses must be considered. However, in our opinion, there was some therapeutic benefit from the use of the estrogen.

CASE 2.* Female, white, age 10 years, presented with lesions similar to those in Case 1, but of a less marked character (Fig. 6).

Complaint. Patient complained of bleeding and swelling of several areas of gum.

Medical History. Negative.

Dental History. Lesion had been present for two years and had been treated by vitamin therapy and local instrumentation.

Medical Examination. Basal metabolism, minus 27. Patient was found to be allergic to several food factors. Diet was adequate.

Laboratory Findings. Urinalysis, mantoux test, blood count, were all negative. Oral and vaginal smears showed low estrin character.

Dental Examination. (Gross)—Except for a slight irregularity of the dental arch, there were no unusual findings. Mouth was clean and fairly well cared for. The interdental papillae between the upper right central and lateral and the upper left central and lateral, were hypertrophic, the proliferative tissue emanating from the gingival crevices. There were other smaller lesions limited to the upper gingivae also originating in the gingival crevice. All the other interdental papillae were slightly swollen and cyanotic in color.

Fig. 6. Case No. 2. Pre-treatment state. Hypertrophy appeared as in photograph but minute clinical examination revealed all papillae to be abnormal.

Microscopic Findings. The tissues appeared similar to those in Case 1, except that they were not as edematous (Figs. 7 and 8).

Treatment. As in Case I, deep curettage and instruction in home care with toothbrush and interdental stimulator resulted in reduction of the lesions in three weeks except for occasional slight and easily controlled recurrences (Fig. 9). Patient kept under observation for one year.

DISCUSSION

These cases are of special interest because of the probable hormonal etiology of the lesions; their persistence under various forms of treatment; and the prompt control effected when the lesions were amputated at

*This case was referred to us by Dr. Albert Kutner.

the point of origin at the bottom of the gingival crevice, accompanied by regular hygienic care.

The theory of the hormonal character of these growths is supported by gross and microscopic comparison with lesions of known hormonal etiology such as those seen in pregnancy gingivitis, in experimentally induced gingivitis in monkeys, or in gingivitis arising during hormonal treatment for some gynecological disorders.

The relationship to an hormonal etiology is based on, (A) the following general considerations:

1. The physical and laboratory findings which were negative except for the fact that the oral and vaginal smears showed a low estrin character.

2. The chronic nature of the lesion.

3. The success of the indicated treatment; the failure of other therapeutic measures.

4. The patient's age, a period when hormonal imbalance may be expected.

5. The infrequency and diminished size of the recurrences during observation period following the course of intensive treatment.

(B) The following specific considerations:

1. The proliferative character of the lesions.

2. The emanation from the gingival

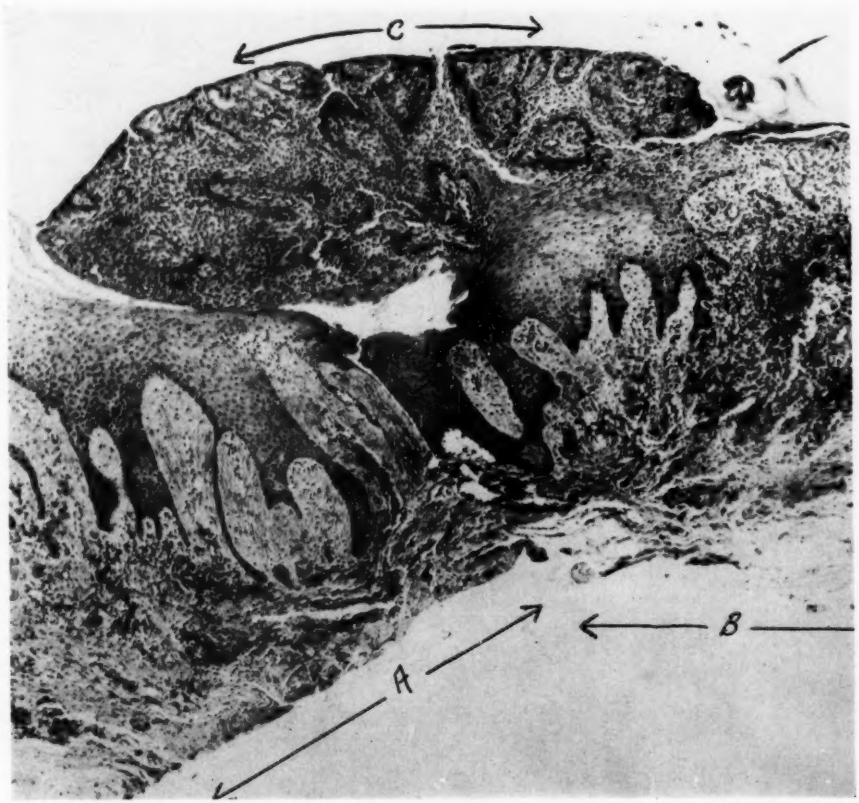


Fig. 7. Case No. 2. Female, white, age 10 years. Biopsy of upper right No. 2 papilla. X76. (A) Area at crest of interdental papilla which was pushed back by proliferation tissue shown at "B" and "C." Hyperplasia of epithelium with downgrowth and pointing and splitting of rete pegs seen at "A" is characteristic. The tissue at "C" resembles granuloma of the gum. Note marked inflammatory exudate at "B" and "C" with comparatively little at "A." This section exemplifies the changes in "hormonal gingivitis."

Fig. 8. Case No. 2. X145. High power of Fig. 7.(A) Area at crest of papilla; (B) proliferation tissue.

Fig. 9. Case No. 2. Condition after curettage and hormone treatment and continued home hygiene. Improved.

crevice and other clinical features resembling pregnancy gingivitis.

3. The similarity of the microscopical picture to pregnancy gingivitis in humans and in monkeys (experimentally induced).

It is our conclusion that proliferations of the alveolar gingivae, of the type described here, in prepubescent and pubescent children may be due to hormonal imbalance. The improvement noted under local treatment does not preclude the possible systemic etiological factor because pregnancy gingivitis responds in a similar manner to the same treatment.

Editorials

The Invasion of Dentistry

WE have been so completely absorbed with the present and coming invasions of foreign countries that we have been unconsciously softened up for the invasion of dentistry by the usual methods of preparing a people for such an event. Our morale has been lowered by the politicos, both in and out of the profession, public health and social service workers, and government officials, many of whom have stressed our shortcomings, condemned our methods of practice, and belittled our accomplishments in dentistry to the public. We are already agreeing with these all-wise prospective bosses of the health professions that perhaps we do not know how to practice dentistry as it should be practiced; that it may be that quantity is of more consequence than quality; that the loss of the natural teeth may be of minor importance when artificial dentures can be so abundantly and quickly made at such low cost by the dental laboratory technicians; that fine restorative work may be impractical and unnecessary; that ideals of personal service for the few should be replaced by controlled and directed dental service for the many.

In this state of mind we are somewhat ashamed that we have not cared for the remaining 75% of the population which is kept constantly before us as a reminder of our sins. If we had known how Jesus fed the multitudes with a few fishes 70,000 dentists might have taken care of 130,000,000 people. It is timely to suggest that until the distribution of corn, butter, meat, and soap is adequately worked out, that hands be kept off the distribution of the health services.

However, make no mistake about it, unless we change from apologists to leaders with a determination to defend at any cost our services from exploitation, dentistry will be invaded by the wasters of public funds, the politicians, and the social service and public health workers most of whom are totally ignorant of dentistry and the importance of quality in every phase of it.

The average man is inately selfish and until he is changed to a being who is naturally unselfish there will still be some who are inadequately clothed and fed. The millennium has not yet arrived.

Dentistry actually does care about the dental health of the public and is willing and anxious, to do something about it, because dentists know better than anyone how important it is. In recent years we have had enough of men ignorant of the facts about them in control of various services.

It is known that representatives of the medical profession were not consulted in the development of the medical provisions of the proposed Wagner-Murray-Dingell bill. Think that over. It is the beginning of the end unless we cease apologizing, speak out, and fight against the Peppers and similar invaders.

For many years we have been inspired by the ideals of prevention of dental ills and many, if not all of us, base our methods of dental procedures upon preventive principles such as extension for prevention in cavity preparation, protection of tooth pulps from thermal shock by the proper cavity lining before inserting a metal filling or inlay, by attending promptly to all small cavities, and by the application of other known means of prevention. Our failure to accomplish all that we hope for in the lines of prevention is often the result of a lack of cöoperation from patients, especially in the home care of the mouth, and their unwillingness to give up the necessary time for dental appointments.

Will the extensive extraction of natural teeth, the mere filling of millions of cavities with indifferent skill for large numbers of people be of much value, unless accompanied with the necessary education and coöperation of these patients in personal home care of the mouth, and in all other related health habits?

Off the Record

THE records from the Surgeon General's Office show that in the year 1942, the Army Dental Corps extracted *3,302,781* teeth for the men in service. To know that 7, 830,688 permanent fillings were inserted also, does not entirely counteract the shock experienced from noting the large number of teeth *extracted*.

When one reads the report of a battle one is inclined to glance quickly over the number of allied soldiers killed and with eagerness to look for the number of allied prisoners taken for it is in this latter group that one prays are the boys who are sons, relatives, friends, and acquaintances; they have been spared at least for the time being. The Generals of the armies of the democracies are surely better satisfied with their live prisoners than twice the number of the enemy left upon the battlefield; the reverse relative proportion would better please the leaders of the enemies' fighting forces, since their objectives are to destroy—to kill.

While the comparison between extracted teeth and dead soldiers may be far-fetched, nevertheless, the psychological reaction to dentists is similar for both. Might it not be best to keep the final report on extractions off the record until the end of the war and stress the number of permanent fillings?

Is it a laudable accomplishment to have extracted nearly three and one-half million teeth in one year, many of which under other than war-time emergency conditions might have been saved? Is it wise to have dentistry evaluated, even in part, by the number of teeth extracted by the Army Dental Corps?

—G. R. S.

ABSTRACTS AND EXTRACTS OF CURRENT DENTAL LITERATURE (Continued from 14(1) January, 1943)

(i) Miscellaneous

(Continued from 12(1):57. Jan., 1941)

221—Barron, Joseph B.: **Dehydration.** *Am. J. Orthodont*, 27:685. Dec., 1941. Abstr. copied from *J.A.D.A.* **29**(3): 508. Mar., 1942.

In the dehydrated person, quality as well as quantity of fluid is important. Dehydration results from acute fever, infection, hemorrhage, low fluid intake, psychic disturbances such as pain or fear, prolonged gas anesthesia, excessive vomiting, diarrhea, burns and shock. It is deleterious to healing. Its symptoms are elevated temperature, increased concentration of urine, dryness of the oral membranes and thirst. In ordinary circumstances, especially for most oral surgical cases, dehydration may be prevented by administration of fruit juices and milk.

—*H. B. McCauley*

222—Berry, Gordon: **Some dental observations by an otolaryngologist.** Ann. Otol. Rhinol. & Laryng., **50**:995. Dec., 1941. Abstr. copied from *J.A.D.A.* **29**(3):510. Mar., 1942.

An intimate relationship exists between dental disease and diseases of the ear, nose and throat. The author believes that transillumination of the teeth is indicated in every case, and if disease is detected, the patient should be referred to a competent dental consultant for vitality tests and x-ray diagnosis. The elimination of dental disease will often alleviate, if not cure, a stubborn sinus infection, recurring nasal trouble or neuralgia.

—*H. B. McCauley*

223—Raybin, Murray: **Disclosing solutions, their importance and uses.** *D. Outlook.* **30**(4): April, 1943.

The use of disclosing solutions routinely in both the office by the dentist and in the home by the patient is emphasized. The author's definition of "disclosing solution" is "a solution which, applied to the teeth, makes visible by staining, roughness and foreign matter on the teeth."

The author refers to the most commonly used disclosing solutions and classifies them as A. Iodine solutions, B. Mercurochrome solutions, C. Dye solutions, and gives formulae for seven of them. These are described as to color, taste, visibility, and duration of the stain.

The formula for the author's disclosing solution follows:

Gentian violet 24 gr.
Ethyl alcohol (95%) 4 oz.
Menthol 3 gr.
Oil of Cloves 3 min.
Oil of Cinnamon 8 min.
Saccharin 2 gr.
Tincture of Cudbear 24 min.
Distilled H_2O qs—1 pt.

The advantages of non-iodine solutions are listed.

—*G.R.S.*

224—Sorrin, Sidney: **Pulp stones and hypercementosis in arthritis.** *J. D. Res.* **20**(6): Dec., 1941.

The purpose of this research was to determine if any relationship exists between either pulp stones or hypercementosis and arthritis.

Among 100 edentulous cases, complete extractions to relieve arthritis had been disappointing.

Forty-eight control ["healthy individuals"] and 46 arthritic cases were studied. While the control cases showed a slightly higher incidence of pulp stones the arthritic cases had a higher incidence of hypercementosis.

The author states that the former showing (re. pulp stones) was so slight as to be insignificant but that the results as to hypercementosis predominating in the arthritic cases suggests further study. Nevertheless, he concludes that, "there seems to be no relationship between either pulp stones or hypercementosis and arthritis."

—*G.R.S.*

225—Tylman, Stanley D.: **A biomechanical approach to the problem of fixed bridge prosthesis.** *J. Tenn. D. A.* **22** (1):14-21. Jan., 1942.

Correct biologic principles must be skillfully applied if a dental restoration is to

function as a health measure. Fixed bridges are preferable where only one or two teeth are missing except sometimes for aged patients and the very young. Restricted movement in fixed bridgework has not been found injurious. Traumatic occlusion is more dangerous. Not over-load but torsion damages supporting structures. Only teeth with healthy periodontium should be used as abutments. Decidedly tipped teeth are undesirable because here forces of mastication are delivered out of line with long axis of tooth. Normal functional stresses exert an intermittent pulling force on the alveolar bone through the periodontal fibres and the biologic response to this stimulus is a deposition of new bone which compensates for that resorbed under pressure. When, however, forces are not directed in a physiologic direction continuous resorption results. The capacity to adjust to conditions and also the actual biting force varies greatly. Functioning teeth make more dependable abutments than those long out of occlusion, where many of the principal fibres of the periodontal membrane have been lost. Habitual vigorous use increases masticatory pressure capacity, or rather the pressure tolerance of the periodontal membrane which acts as a sort of protective gauge against excessive harmful biting stresses. If these forces "were always distributed equitably and only in a direction parallel to the long axes of the roots, there would be very little difficulty experienced with fixed bridges, even in those cases having extensive spans; this ideal situation, however, rarely exists."

—Celia Rich

226—Winslow, C. E. A.; L. P. Herrington; Jean Hume Nelback. **Influence of atmospheric temperature and humidity on dryness of oral mucosa.** *Am. J. Hyg.* **35**:27. Jan., 1942. Abst. *J.A.M.A.* **118**(15):1325. April 11, 1942.

Winslow and his collaborators determined the effect of various degrees of temperature and humidity on the mucous membranes of 4 subjects. With a vapor pressure of up to or above 4/10 inches of mercury the moisture of the surface of the oral mucosa, depending on variations in temperature and humidity, varied from a moderately high to an extremely high value. The variations were attributed to the physiologic changes in the vascular system of the mucosa. With vapor pressures below 4/10 inches there was a definite dryness of the oral mucosa; its surface moisture was about half that observed at higher vapor pressures. The authors conclude that a pronounced drying effect on the mucosa must occur at air temperatures below 53 F. with any moisture content, at 60 F. with less than 77 per cent relative humidity, at 70 F. with less than 54 per cent relative humidity and at 80 F. with less than 39 per cent relative humidity. Whether the drying effect is harmful has not been determined, but, if it is harmful, outdoor air in winter must have as serious an effect as dry indoor air. The effect can be controlled indoors with an air temperature of 70 F. and a relative humidity of more than 50 per cent.

—Copy

(d) Etiology

(Continued from 13(2):105. July, 1942)

463—Black, W. C.: **Etiology of acute infectious gingivo-stomatitis.** (Vincent's stomatitis). *J. of Pediatrics.* Feb. 1942. Abstr. in *J.A.M.A.* **119**(4):373. May 23, 1942.

Black presents clinical and experimental evidence which demonstrates that herpes simplex virus is the primary etiologic agent of "acute infectious gingivo-stomatitis" which condition, he suggests, should be known as acute herpetic gingivo-stomatitis. The course of the experimental lesion in the inoculated rabbit's eye is typical of herpetic kerato-conjunctivitis produced by known strains of herpes simplex virus. The infection is easily transferred to other rabbits. The lesion in the rabbit's eye contains intranuclear acidophilic inclusion bodies, indistinguishable from those produced by known strains of herpes simplex virus. After the infected animals recover they are immune to further virulent inoculations. The agent carried in serial inoculations of rabbits and mice for months produced uniformly the typical clinical picture of fatal herpetic encephalitis when injected intracerebrally into rabbits or mice. The presence of the herpes simplex virus in the lesions of acute infectious gingivo-stomatitis is neither incidental nor accidental, but etiologic. The virus is not commonly present in the normal mouth or in mouths with other types of inflammation, whereas it is found on a single examination of approxi-

mately 90 per cent of the mouths in which there is acute infectious gingivo-stomatitis. Humoral immunity is present after the disease has run its course, but it is not commonly present during the early stages of the disease. Ten, or more than 40 per cent, of 23 patients were known to have been intimately exposed to a source of herpes virus, whereas only 8 per cent of patients with other types of oral inflammation gave such a history. A typical attack of acute herpetic gingivo-stomatitis followed inoculation of a volunteer's mouth with the fluid from the vesicles of a herpes simplex lesion.

—Copy

464—Burket, Lester W., and George C. Hickman: **Oral herpes (simplex) manifestations; treatment with vitamin B complex.** *J.A.D.A.* **29**(3):411-18. Mar., 1942.

Herpetic lesions are commonly seen by dentists. As to etiology there are primary and secondary exciting factors. While an acute upper respiratory infection or bright sunlight may bring on an attack in sensitive individuals it is now common belief that a virus is the exciting factor. Many accept the idea that an allergy or focal infections are related predisposing factors. There are also other predisposing conditions such as pneumonococcal pneumonia, meningitis, the common cold, influenza, menstruation, pregnancy and thyroid disease. These conditions result in a need for vitamin B complex which is advised.

The pathology, symptomatology, differential diagnosis, and treatment are discussed and six case reports given. In some of them thiamine chloride was the antiherpetic factor of the B complex.

Concentrated preparations if given for a few days only will do no harm. The following dosage per day was generally found satisfactory for solitary lesions: 5 mg. of thiamine chloride, 5 mg. of riboflavin, and 50 mg. of nicotinic acid. This is naturally not all absorbed. Natural sources of these vitamins are preferred for maintenance purposes, but when impractical 1 mg. of thiamine chloride per day is prescribed.

It is emphasized that this is not a treatment for traumatic lesions or for periadenitis mucosa necrotica recurrens.

—G.R.S.

465—Cahn, L. R., and H. A. Bartels: **Aphthae and herpetic gingivo-stomatitis.** *Am. J. of Orthodont. and Oral Surg.* March, 1942. Abstr. *J.A.M.A.* **119**(8):674. June 20, 1942.

Results of various studies, Cahn and Bartels point out, demonstrate that aphthous ulcer, herpes labialis, aphthous stomatitis, herpetic stomatitis or acute infectious gingivo-stomatitis are caused by the herpes virus. The virus from aphthous lesions, when inoculated on the scarified cornea of rabbits, produced lesions identical to those caused by the herpes simplex virus. Encephalitis was induced in some animals subsequent to their inoculation with the virus from either herpes or aphthous lesions. Inclusion bodies were demonstrated in the cells of the injected cornea and the brains of animals inoculated with the virus of herpes or the virus of aphthous stomatitis. Rabbits inoculated with the virus of aphthous stomatitis were immune to the herpes virus. The herpetic antibody develops in the patient's serum during convalescence from herpes or aphthous stomatitis. The infection usually takes place in early childhood and is present thereafter. The virus remains dormant until some contributory factor lowers the local immunity of the tissue, when herpetic lesions occur. In contradistinction to other virus diseases, immunity is not permanent after an initial herpes simplex infection.

—Copy

466—Glickman, I., and H. Wood: **Bone histology in periodontal disease.** *J.D.Res.* **21**:35-54. Feb., 1942.

In a study of four cases, using autopsy material, authors found that inflammation is not essential for destruction of alveolar bone; also, bone formation may be found, as well as bone resorption, adjacent to periodontal membrane associated with gingival inflammation. Predominant tendency toward bone formation or resorption exhibited adjacent to periodontal membrane is simultaneously paralleled in remainder of jaw and other regions in skeleton. Therefore, periodontal bone loss can occur in absence of local irritants; and, furthermore, periodontal bone loss may represent local manifestation of generalized tendency toward bone resorption, as shown in other bones in the individual case. Identical bone changes were found in cases representing different age

groups and presenting different degrees of periodontoclasia clinically. No special types of bone changes were found which were peculiar to the bone around the teeth or which were pathognomonic of periodontoclasia; and no special types of bone change were found to justify classification of periodontoclasia on histological basis. Therefore, periodontoclasia is not a specific type of bone disease, nor can it be classified into different types on basis of bone changes.

—*Martin Blumenfeld*

467—Kaufman, William H., and Dudley C. Smith: **Cutaneous changes in the sprue syndrome.** *J.A.M.A.* **121** (3): 168-173. Jan. 16, 1943.

Two fundamental concepts concerning sprue are: (1) that celiac disease in children, tropical sprue and non-tropical sprue all are variations of a single disease complex; (2) that sprue is often due to nutritional deficiency. The oral lesions found in the majority of cases are regarded as of great diagnostic and prognostic importance. The mucosal changes may reflect similar conditions throughout the digestive tract. Thaysen studied 34 cases and reported 26 with stomatitis, this symptom usually appearing after the onset of diarrhea. Aphthae were rare and found most often on lateral edges of the tongue; less frequently on under surface of tongue and buccal surface of lips. Burning and smarting sensation and troublesome salivation were frequent. Other workers report from 22.5 to 67% of cases to have small aphthae on oral mucosa. In a typical case reported there was extreme pallor of mucous membrane, glossitis and marked gingivitis. The glossitis, stomatitis and fissuring of corners of the mouth in sprue, respond favorably to liver extract and are apparently related to vitamin B deficiency, but the disease may be a multiple avitaminosis. The insidious onset of sprue is usually preceded by a long period of dietary imbalance with too little protein and excess of fats and carbohydrates. Authors differentiate the skin pigmentation of sprue from that of pernicious anemia, Addison's disease and other pigmentary diseases.

—*C.R.*

468—Lancaster, A. H.: **Mouth lesions of common interest to the dental and medical profession.** *J.Tenn. D.A.* **22** (1):5-13. 1942.

Mucous membrane and lips are often first indicators of dermatologic disorders. Recognition of chancre and mucous patch is important for dentist's protection, as well as for patient. Among lesions described are chancre, mucous patches, gumma, verruca or warts, mucous retention cyst, granuloma pyogenicum, cheilitis, acute and chronic, leukaplakia, and keratoses of the lips. Leukaplakia "must be considered precancerous." When cracked lips following dental work fail to heal, dermatologist should be consulted. Cancer of the lip may be distinguished from chancre by the greater rapidity with which latter develops and chancre is accompanied within 10 or 15 days by definite submental and submaxillary adenopathy. Electro-galvanic lesions are often produced by metals of differing electrical potential in various dental restorations. Author considers gold inlays preferable to amalgam fillings in this regard. In stubborn aphthous stomatitis, allergy must be considered and sometimes a complete blood examination may be necessary in order to establish etiology. A dangerous complication of Vincent's infection is agranulocytosis which is rare but usually fatal. Arsenicals, because they also tend to produce this blood condition, are contra-indicated in Vincent's. Bismuth sodium tartrate is a safe substitute; nicotinic acid has definite value as an aid to local treatment. Various benign fibromata may develop into malignancy when subjected to mild long continued irritation. Coincidence of cancer of buccal mucosa with tobacco chewing and similar habits supports the theory that chronic irritations are a factor in these cancers. When recognized and treated early this type is most susceptible to cure; whereas in cancer of tongue and of floor of mouth prognosis is very bad. Oral or dental sepsis favors development and hinders recovery from cancer.

—*C.R.*

469—Rudman, P.: **Pyorrhea alveolaris and the ductless glands.** *D. Outlook.* **29**: 14-15. Jan., 1942.

Among the local causes of paradentosis, formation of gingival pockets plays a considerable part in the evolution of the disease. However, local causes cannot provoke paradentosis unless there exist predisposing

internal causes; if these systemic causes are lacking, local factors cannot create a true paradentosis. In the author's experience with 124 paradentotics (St. Antoine's Hospital in Paris), he found 60% with definite endocrine disorders. He considers that this figure would be still higher if patients with endocrine disturbances not apparent at the time, but who may have had them previously, were also counted. Dr. Rudman's clinical research has shown that 100% of patients with endocrine disorders are victims of paradentosis, and that 60% of patients with paradentosis have well-established endocrine disorders. He considers the dental pulp as a gland of internal secretion. In paradentosis, endocrine disorders produce repercussions on the dental pulp, causing all the clinical, histological, and toxic phenomena.

—*M.B.*

470—Rudy, A., and M. M. Cohen: **Oral aspects of diabetes mellitus.** *J.A.D.A.* **29**:523-534. April, 1942.

Authors report on study of diabetic patients, with regard to their oral condition. Eighteen cases of children and young adults are summarized in a table; seven other cases in older adults are presented in detail, with photographs. Etiology and pathogenesis of oral manifestations in diabetes mellitus are still unsolved. In the adult medically controlled diabetic, clinical and roentgenographic observations have shown a high incidence of marginal type of periodontitis due to calculary deposits and lack of oral hygiene. Periodontosis, however, occurs infrequently in adult diabetics; only three out of a large group of the authors' patients showed advanced periodontosis. The response of most manifestations in mouth of diabetic to vitamin therapy, and the fact that same pathologic picture can be found in any debilitating disease, strongly suggest that vitamin deficiency may be etiologic factor, especially deficiency in vitamin B complex factors. Further studies in this direction are in progress.

—*M.B.*

471—Schour, Isaac, and Bernard G. Sarnat: **Oral manifestations of occupational origin.** *J.A.M.A.* **120**(15): 1197-1207. Dec. 12, 1942.

Interesting throughout with excellent tables and illustrations. Author's summary and conclusions:

"1. The problem of oral manifestations of occupational origin must be considered according to the pathologic process, structure affected, etiologic agent and occupational distribution.

"2. The oral cavity is a chief port of entry for occupational noxious agents. All medical examinations of industrial workers should therefore include an oral examination.

"3. In the study of occupational disease an examination of the oral cavity offers the following advantages:

(a) The oral cavity is easily accessible.

(b) Local effects are readily recorded in exposed enamel and in dentin and in the soft structures. The record in the enamel and dentin is often permanent and may reveal past occupational exposures.

(c) Systemic effects may be transmitted in the oral cavity through the blood stream and the saliva and are often manifest in characteristic symptoms.

"4. Poor oral hygiene renders the worker more susceptible to oral occupational hazards. These hazards are minimized in the presence of oral health. Oral hygiene is an essential part of industrial hygiene.

"5. Adequate provision for industrial health should include the prevention, the early recognition, and the treatment of oral occupational diseases. The problem of reducing oral occupational diseases should, therefore, be met by (a) improving working conditions and (b) establishing and maintaining optimal oral and general health.

"6. Further studies of occupational disease should be conducted in order to check or confirm previous reports and to discover possible manifestations arising in new industries."

—*C.R.*

472—Sorrin, Sidney: **A case of tooth decalcification.** *N.Y.J.Dent.* **11**(10): 361. Oct., 1941.

Most cases of tooth decalcification have been traced to chemical, bacterial or mechanical agents. The case reported here involves the aforementioned factors in addition to others.

Male patient, 54 years of age, house painter, is suffering with carcinoma of the lung. Radium therapy was begun Decem-

ber 23, 1940. There has also been stiffness of the joints for which two teaspoonsful of Bulgarian atropine per day had been prescribed. This treatment was begun December, 1940, from which date on dryness of the mouth was noted. To relieve this, a box of cough drops was used each day by the patient for a period of several months. A cross method of brushing had been employed, but when the teeth became sensitive, all toothbrushing was discontinued. A soft non-detergent diet had been eaten by the patient for a long period of time due to a gastrointestinal disturbance.

The patient reports that the teeth had "broken off" since medical treatment was started. The medical report suggests the possibility of tooth decalcification accompanying irradiation. However, since irradiation of the lung and not the jaw was employed, this factor was not considered to be the important one.

The decalcification has been extremely rapid and it appears that it occurred through the combination of (1) Use of atropine which caused dryness of the mouth, (2) The continual use of cough drops, (3) The employment of a soft non-detergent diet, (4) Cross method of brushing.

—Copy

A BIRD'S-EYE VIEW OF CURRENT PERIODONTAL LITERATURE

1927 - 1943

Beginning in the January, 1931, issue of the Journal of Periodontology and continuously since then we have published more than 2400 abstracts of articles on periodontology and related sciences which appeared in the current dental and medical literature from 1927 to 1943.

While many of the abstracts were copied from other publications the great majority were especially made for this Journal. This was most difficult when the original article was printed in a foreign language periodical which was the case with many of them prior to the war. While no attempt was made to abstract *all* articles on periodontia, at least a sufficient number of worthwhile ones were abstracted and the abstracts published, to cover quite satisfactorily the periodontal literature of the period mentioned above.

A careful reading of these abstracts would serve as a basis for a broad understanding of periodontology. Many of the back issues of the Journal are still available and would be valuable to any dentist interested in periodontology.

Bold face figures refer to abstracts, light face figures to pages

Atmospheric temperature and humidity, influence of, on oral mucosa, (i)226-98

Biomechanical approach to fixed bridge prosthesis, (i)225-97

Dental observations by otolaryngologist, (i)222-97

Dehydration, (i)221-97

Diabetes mellitus, oral aspects of, (d)470-101

Disclosing solutions, (d)223-97

Gingivo-stomatitis, apthae and herpetic, (d)465-99

Gingivo-stomatitis, etiology of, (d)463-98

Mouth lesions of common interest, (d)468-100

Oral herpes, simplex, manifestations and treatment, (d)464-99

Oral manifestations of occupational origin, (d)471-101

Periodontal disease, bone histology in, (d)466-99

Pulp stones and hypercementosis in arthritis, (i)224-97

Pyorrhea alveolaris and ductless glands, (d)469-100

Sprue syndrome, cutaneous changes in, (d)467-100

Tooth decalcification, case of, (d)472-101

INDEX OF AUTHORS

Barron, Joseph B. ---------- 97

Berry, Gordon ---------- 97

Black, W. C. ---------- 98

Burket, Lester W., and Hickman, G. C. ------ 99

Cahn, L. R., and Bartels, H. A. ---------- 99

Glickman, I., and Wood, H. ---------- 99

Kaufman, William H., and Smith, D. C. ------ 100

Lancaster, A. H. ---------- 100

Raybin, Murray ---------- 97

Rudman, P. ---------- 100

Rudy, A., and Cohen, M. M. ---------- 101

Schour, Isaac, and Sarnat, B. G. ---------- 101

Sorrin, Sydney ---------- 97

Sorrin, Sydney ---------- 101

Tylman, Stanley D. ---------- 97

Winslow, C. E. A., Herrington, L. P., and Nelback, J. H. ---------- 97

Index of The Journal of Periodontology, Vol. 14, 1943

January

Diagnosis and Treatment of Fungus Infections of the Oral Cavity	T. A. Hardgrove	7
The Occlusal Factor in Periodontal Disease	Harold J. Leonard	12
A Dental Physician	E. Melville Quinby	24
An Investigation Concerning the Dentitions of the Esquimos of Canada's Eastern Arctic	Chas. H. M. Williams	34
The Use of Paraformaldehyde and Oxygen in Periodontal Treatment	Balint Orban	37
Editorials		45
Abstracts of Current Dental Literature		47
Report of 1942, A. A. P. Council Meeting		56
Index of Abstracts and Authors		59

July

Rationalization of Periodontal Pocket Therapy	Charles H. M. Williams	67
The Tooth Brush	Benjamin Alstadt	77
Two Cases of Subgingival Proliferative Lesions of Probable Hormonal Origin	Daniel E. Ziskin and Herbert F. Silvers	89
Editorials		95
Abstracts and Extracts of Current Dental Literature		97
A Bird's-Eye View of Current Periodontal Literature		102
Index of Abstracts and Authors		103